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TECHNICAL NOTE TN-316

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NESTING HABITATS AND SURVEYING TECHNIQUES FOR COMMON WESTERN RAPTORS

by Mayo W. Call

Bureau of Land Management, Denver Service Center

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BY

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Alberta Recreation, Parks, and Wildlife: Figs. 1, 6, 26A, 32, 35, 39, 42, 45, 49, 52, 65A, 73, 80, 89, 99, 110, 117.

Allen, David: Fig. 90 (upper).

Call, Mayo W. : Figs. 7, 8, 9, 10 (all), 11 (all), 12, 14, 17, 18, 22 (upper), 25, 27 (all), 28 (middle & lower), 30, 31, 36, 37, 38, 40 (upper right & lower), 43, 44, 46, 51, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 66, 67, 68, 69, 70, 71, 74, 75, 76, 77, 85, 90 (lower), 91, 95, 98 (both), 101, 102, 103, 112, 113, 116, 120, 122, 123.

Colcord, Diane: Cover Drawing, Figs. 2, 3, 15.

Craighead, Frank: Figs. 23, 108.

Dunder, James: Fig. 90 (middle).

Erwin, Robert: Fig. 41.

Grubb, Teryl: Fig. 4.

Jurs, Lou: Fig. 22 (lower), 34.

Kochert, Mike: Figs. 28 (top), 96.

Millsap, Brian: Figs. 82, 111, 114, 121.

Mires, Jerry: Fig. 106.

Murphy, Joseph: Fig. 13.

Neitro, William: Figs. 104, 105, 107.

Oftedahl, Larry: Fig. 99.

Olendorff, Richard: Fig. 78.

Oregon Department of Fish and Wildlife: Fig. 109.

Paul, Don: Fig. 46.

Platt, Joseph: Fig. 48.

Schwarz, John: Fig. 93.

Scott, Virgil: Fig. 119.

Sibley, Fred: Figs. 92, 94.

Snyder, Noel & Helen: Figs. 26, 40 (center), 47, 48, 50, 72, 83, 84, 86, 88, 118.

U. S. Forest Service: Figs. 5, 16, 19, 20, 97.

U. S. Fish and Wildlife Service: Fig. 21.

Warburton, Joshua: Fig. 65.

Whaley, Wayne: Fig. 87.

White, Clayton: Fig. 24, 29, 32A, 81.

Woffinden, Neil: Fig. 79.

TABLE OF CONTENTS

Page

INTRODUCTION 2

BACKGROUND INFORMATION 3

Need for Raptor Nest Site and Other Habitat Use Data . . . 3

General Considerations 3

Distribution of Nesting Raptors 4

Preferred Nesting Habitats 4

Raptor Nesting Phenology 4

Raptor Feeding Ranges During Nesting Period 5

Competition for Nesting Sites 5

PROCEDURES FOR CONDUCTING RAPTOR NESTING SURVEYS 6

Locating and Examining Nesting Habitats 6

Map and Photo Studies 6
Aerial Surveys 6
Ground Surveys 6
Timing of Surveys 7

Precautions at Nest Sites and Dangers to Birds of Nest Examinations 7

Special Precautions for Surveying Nesting Habitat of Endangered, Threatened, or Sensitive Species of Raptors .. 8

SPECIFIC RAPTOR NEST AND HABITAT CHARACTERISTICS AND SURVEY METHODS 9

DIURNAL SPECIES NEST SURVEYS 9

Bald Eagle 9

Golden Eagle 13

Osprey 19

Peregrine Falcon 22

Prairie Falcon 26

Page

Gyrfalcon 31

Merlin 34

Kestrel 37

Goshawk 41

Cooper's Hawk 42

Sharp-shinned Hawk 44

Ferruginous Hawk 51

Red-tailed Hawk 52

Swainson's Hawk 56

Rough-legged Hawk 60

Red-shouldered Hawk 62

Black Hawk 63

Zone-tailed Hawk 64

Harris' Hawk 67

Gray Hawk 69

Marsh Hawk 70

Turkey Vulture 73

California Condor 74

Common Raven 76

NOCTURNAL SPECIES NEST SURVEYS 78

Surveys for Owl Nests and/or Territories 78

Suggested Survey Methods 80

Great Horned Owl 82

Short-eared Owl 84

Long-eared Owl 85

Page

Spotted Owl 87

Great Gray Owl 90

Snowy Owl 91

Screech Owl 93

Burrowing Owl 94

Saw-whet Owl 95

Pygmy Owl 97

Elf Owl 98

Flammulated Owl 99

Barn Owl 101

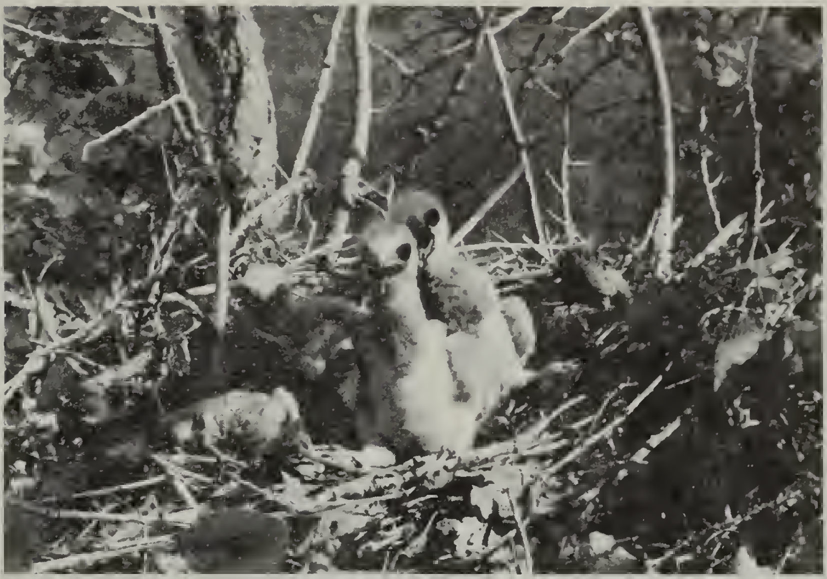
APPENDIX 1, Western States in Which Birds of Prey Nest 103

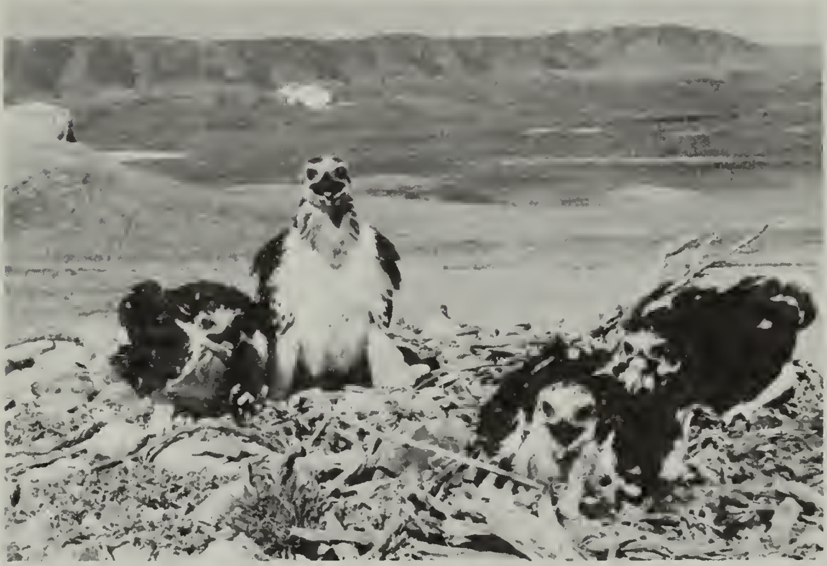
APPENDIX 2, Raptor Nesting Site Preferences 106

APPENDIX 3, Territorial Requirements of Birds of Prey 109

APPENDIX 4, Nesting Phenology of Birds of Prey 110

APPENDIX 5, Raptor Inventory Data Sheet 111





Whose Nests Are These?

NESTING HABITATS AND SURVEYING TECHNIQUES FOR COMMON WESTERN RAPTORS

INTRODUCTION

For many years the birds of prey, known as raptors, were considered by many to be the villains of the sky. Occasionally, an eagle would be observed stooping from the sky to kill a sage grouse for breakfast or a "chicken hawk" would send a farmer's barnyard fowl scurrying. Likewise, Golden Eagles will sometimes kill newborn lambs, an event that does little to endear them to ranchers who consider this to be equivalent to a $30. theft of personal property. In the eyes of the observer, too often such aerial predators would be considered to be in competition with the hunting sportsman or endangering the economy of the small farmer.

However, in recent years a large segment of the American public has become aware of the ecological role of all predators and are not only accepting them as a vital part of the environment but are becoming increasingly interested in them because of their esthetic, economic, and scientific qualities. Raptors, as all animals, must eat to live and are a dynamic part of the flow of energy through many terrestrial and aquatic ecosystems.

Being high on the food chain, raptors may be used as environmental barometers. Because they feed largely on the primary consumers, the next lower rung on the food chain, they pick up residual toxins that have built up in the tissues of such animals as fish, jackrabbits, ground squirrels, and other small animals. By monitoring the amounts of toxins in raptors, scientists can help us better realize what is happening to our environment. In addition, preying on large numbers of small rangeland rodents and rabbits may dampen the damage to range plants by these animals when their populations are at high levels. The jackrabbit is known to be the major prey item for Golden Eagles, Ferruginous Hawks, Red-tailed Hawks, and Great Horned Owls in many parts of the West.

Because of the recognition of the many values of raptors, they are now totally protected by Federal Law and by most states. In order to protect key areas of their habitat from modification or complete destruction by man, it is imperative that we learn to identify their crucial habitats. The passage of the Endangered Species Act of 1973 (P.L. 93-205) and the Federal Land Policy and Management Act of 1976 (P.L. 94-579) makes it imperative that a determination be made of the species of birds using public lands and what the impacts on various birds might be with different types of land use activities.

This Technical Note provides a description of the nesting habitats of most of the common western raptors and describes survey methods that may be used for locating the specific nesting sites of these birds.

BACKGROUND INFORMATION

Need for Raptor Nest Site and Other Habitat Use Data. Basically, raptor habitat use information is needed by land managers for the following reasons:

1. To be knowledgeable on important nesting, feeding, wintering, and roosting areas in order to give adequate consideration to these areas in land management decisions.

2. In order to be able to determine and monitor the effects of man's activities on nesting or other life phases of raptors.

3. In order to ascertain general trends in raptor populations and productivity, by species, and the probable reasons for those trends.

General Considerations. A great variety of birds of prey, both diurnal and nocturnal, use the public lands during some part of their annual activities, either for nesting, feeding, or roosting. Because of wide differences in their inherent behavior patterns, it is easy to understand why a wide spectrum of nesting sites and habitats are utilized.

Some species of raptors will accept a *wide variety* of nesting sites, while *others show very little flexibility, or adaptability,* in utilizing a diversity of nesting sites or habitats. For example, the Prairie Falcon exhibits little ability to nest anywhere except in cavities or on ledges in relatively sheer cliffs or rock formations, whereas Ferruginous Hawks *in some states* may nest either on the ground, in trees, or on practically any elevated natural or man-made structure.

In commencing to conduct surveys for the various raptors that may be found in an area, the biologist should realize that, aside from a few areas that are fairly desolate in terms of prey or vegetation, most habitat on public lands *may be suitable for nesting by one species of raptor, or another.* Of course, prey abundance and an appropriate nesting site are both key factors in determining the *suitability* of an area for nesting by any particular species of bird of prey. Even then, far-ranging raptors, such as Golden Eagles and the larger falcons, may search wide reaches of their feeding range for prey during the nesting season, *even where prey is sparse. The general disturbance caused by many of man's activities may also be sufficient to discourage many species from nesting in an area, even though other key factors are suitable.* Such disturbance may gradually reduce the number of total sites available to easily disturbed birds, such as Golden Eagles and Prairie Falcons. On the other hand, Marsh Hawks (Harriers) and Short-eared Owls *might* be found nesting almost anywhere on public land ranges in grassland, sagebrush-grassland, or marshy areas.

The *bulk of the population of nesting raptors of any species* will be found in certain habitat types that we have come to recognize as their predominant nesting sites. As the reader reviews the remainder of this document, he should keep in mind that both the text and photographs relate to the *predominant* nesting sites of the species discussed. For example, trees will not be discussed as nesting sites for Prairie Falcons, even though the author is aware of *one nest* of this species where young were successfully fledged from an old Ferruginous Hawk nest in a tree. Similarly, *one pair* of Swainson's Hawks successfully fledged young from a ground nest on a rocky hillside, *but both situations were the result of either excessive disturbance or destruction of their first nesting attempt during that year.*

Distribution of Nesting Raptors. States in which the various raptors are known to nest are shown in Appendix 1. Certain raptors nest in only a few states, while others are widely distributed. Some raptors will nest predominantly, or entirely, in certain parts of a state by virtue of topographic features, prey abundance, or other special features that meet some particular need for the bird's survival.

Preferred Nesting Habitats. Predominant nesting habitats used by the different raptors (cliffs, ground, trees, etc.) are presented in Appendix 2. Many raptors nest predominantly in one type of habitat, such as Prairie Falcons in cliffs, while others, e.g., the Red-Tailed Hawk, nest on ledges of cliffs or in a wide variety of types of trees. Ferruginous Hawks will nest in a wide variety of sites, including flat ground, pinnacles, low rocky outcroppings, on sharp ridges or points of ridges in the desert, in trees of virtually any height, and on a variety of man-made structures, such as windmills, rock monuments, stone chimneys, and many others. While Appendix 2 presents the predominant nesting habitats, or substrates, for the different species, keep in mind that unusual happenings are to be expected in Nature.

Raptor Nesting Phenology. Common dates for the various phases in the nesting sequence are presented in Appendix 4. These average dates will serve most purposes, but the biologist should be aware that variations will occur from year to year depending on climatic conditions and also with latitude and elevation. As a general rule, birds in southern latitudes will begin nesting before the birds in the northern latitudes, and birds at lower elevations before birds at higher elevations. Some raptors commonly have more than one clutch per year, e.g., Harris Hawk, Barn Owl, etc., so second nestings will obviously be later than dates indicated in the table. Also, some raptors will re-cycle and make a second nesting attempt if the first one is unsuccessful.

Raptor Feeding Ranges During Nesting Period. General activity and feeding ranges for nesting raptors are presented in Appendix 3. It must be recognized that feeding ranges, as well as defended territories will vary according to prey abundance, terrain, raptor population density, and other factors. Disturbance by man within these indicated ranges *may* cause adverse impacts on the nesting birds, *especially if such disturbance is within their primary feeding area.*

Competition for Nesting Sites. Many species of birds of prey will utilize nests constructed by other species. For example, Great Horned Owls and Long-eared Owls commonly nest in Buteo and Accipiter nests. Long-eared Owls, Merlins, and even Kestrels may utilize Magpie nests. Red-tailed Hawks, Swainson's Hawks, and Ferruginous Hawks will use each other's old nests, or even Golden Eagle nests, and Prairie Falcons sometimes use old Golden Eagle, Red-tailed Hawk, or Raven nests that are constructed on cliffs. Because of this somewhat common interchange of nests, some competition results for the nest sites between the various species, especially where trees or cliffs are scarce. Normally, the first pair of birds that assumes possession of an old nest will assert the necessary defense to maintain their possession, but not always. Also, differences in nesting phenology may permit utilization of the same nest by two different species during the same year, e.g., Great Horned Owls may rear a brood of young and leave a nest site about the time that Swainson's Hawks or Cooper's Hawks begin to nest. In such cases, these birds may utilize the abandoned owl nest. Aggressive interactions between Prairie Falcons and Great Horned Owls are known to have caused the abandonment of nest sites by Great Horned Owls. The Prairie Falcons then nested at the sites. *In general,* none of the owls construct any type of stick nest. Instead, they utilize other birds' nests or else nest directly on the dirt in natural rock cavities (or sometimes on pack rat nests) or on the debris of tree cavities. In a very few instances, owls have been reported to partially reconstruct deteriorating stick nests prior to laying eggs.

Information Sources. Much of the information included in this Technical Note is based on the author's experience and his conversations with others who have been involved in raptor surveys. The reader should not be disturbed if he observes birds of prey nesting in situations not described in this Technical Note, especially with regard to species of trees used for nesting, since raptors will use trees of suitable height, foilage density, etc., that are available in the locality in which they are living. In addition, information on some species was gleaned from the following publications: *Raptors of Utah, Wyoming Hawks, Life Histories of North American Birds of Prey (Bent), Water, Prey and Game Birds of North America, American Peregrine Falcon Recovery Plan* (Rocky Mountain and Southwest Populations), and the BLM Endangered Species Technical Note series. References are given as numbers in parentheses ( ) which are keyed to the Literature Cited section.

PROCEDURES FOR CONDUCTING RAPTOR NESTING SURVEYS

Locating and Examining Nesting Habitats

1. Map and Photo Studies.

   A. Determine the potential nesting sites (clumps of trees, cliffs, suitable ground vegetation, etc.) for the various species of raptors by examining appropriate maps and aerial photographs. Some knowledge of raptor nesting requirements is essential before this evaluation can be made.

   B. Plan aerial and/or ground survey routes to the potential raptor nesting areas.

2. Aerial Surveys.

   A. Make flights over areas delineated on a map as being potential raptor nesting sites and note locations on map of all nests observed and suitable habitat that should be examined from the ground.

   B. Where special or unique topographic features are being used as raptor nesting sites, obtain aerial photographs of the site for the raptor nesting file.

   C. Plan a flight to re-visit the active nests at a time when the young will be in the nest. This may be determined fairly well from the phenology table in the appendix of this Technical Note. Specific areas will vary depending on weather and latitude and different phenological events should be adjusted accordingly. Nesting success can be determined for many nests during this flight.

3. Ground Surveys.

   A. Utilizing the best access routes observed from the air or shown on maps, visit all nests and all potentially suitable nesting habitat.

   B. Examine all active nests and potential habitat until satisfied as to nesting species of raptors present. If this is done prior to egg hatching, binoculars should be used from a distance to obtain the desired information. After the young appear in the nest, there is less chance for nest abandonment and closer approaches may be made to the nest. Using a raptor data form, such as the example in Appendix 5, record the pertinent data for each raptor nest located.

C. All old nests should be mapped as these may be alternate nest sites for active pairs or may be used by other species in subsequent years.

D. Photographs of the general nesting area, or aspect, should be taken during the first visit. If young are in the nest, a close approach to the nest may be made to obtain a photographic record of the number of young in the nest and their relative condition and/or age.

4. Timing of Surveys.

A. Time of nesting surveys will depend on the nesting phenology of the species for which information is desired. Surveys should normally be timed to visit nests approximately one-half to three-fourths of the way through the nesting sequence. Disturbance of nesting birds should be avoided, especially during early courtship, nest building, egg laying, and incubating phases. Some raptors will abandon their nests even if visited by humans only once if the bird is in either the laying or incubating phase.

B. Appendix 4 presents average nesting sequences that may be used as a general guide. Recognize, however, that nesting sequences will vary, either earlier, or later, depending on latitude, seasonal variations in weather patterns, elevation, and possibly other factors.

Precautions at Nest Sites and Dangers to Birds of Nest Examinations

1. Adult birds should not be flushed from the nests, especially when eggs are present, unless necessary to collect data on nesting phenology or reproductive success. If adult birds are flushed from the nest, try to limit the stay at the nest to five minutes or less.

2. When adults are forced from the nest, there is increased chance for predation by both aerial and ground predators. Sprinkling napthalene crystals (moth balls) around a nest site and along your entrance trail will help to destroy your human scent and may decrease the chances of predation at the nest by ground predators.

3. Adult birds should not be flushed from the nest during rainstorms, in very cold weather, especially in windy weather, or in hot weather. To do so for longer than a very few minutes may cause the death of the embryos or young birds due to excessive cold or heat.

4. Be sure adult birds and/or young are aware of your presence as you approach the nest. Do not startle incubating or brooding adult birds as they may spring from the nest, knocking young birds or eggs from the nest.

5. Dehydration of eggs or an adverse change in humidity may occur if eggs are left unprotected for more than a few minutes.

6. Young birds may miss essential feedings and become weakened if adults are kept away from the nest for extended periods.

7. Be very careful in approaching nests where young birds are old enough to fledge at your approach. In fledging prematurely, they may damage bones, incur other injuries, or become lost and/or abandoned.

8. Do not handle eggs or young birds unless necessary for banding, weighing, etc. as part of a data collecting project approved by the State Wildlife Agency.

Special Precautions for Surveying Nesting Habitat of Endangered, Threatened, or Sensitive Species of Raptors.

1. Nests of raptor species having an endangered classification should not be visited unless accompanied by an authority on the species for a specific research or monitoring purpose. They should be observed only from such distance that the adult birds are not disturbed, i.e. either with binoculars or spotting scope.

2. Special caution should be exercised in visiting nests of any species known to be declining in numbers, either locally or nationally.

3. Nests of species that are known to be highly sensitive to humans and that abandon nests readily (such as Ferruginous Hawks) should not be visited until young birds can be discerned in the nest.

4. Nest locations of endangered or threatened species of raptors should be revealed only to competent State or Federal authorities. Loss of nests or young of such species from unnecessary human visitation cannot be tolerated for endangered, threatened, or sensitive species, or for any species whose overall habitat is known to be seriously declining.

5. All Bald and Golden Eagles are fully protected under the Bald Eagle Protection Act. All nesting surveys of these species *must* be conducted with minimal disturbance to the birds.

Specific Raptor Nest Characteristics and Survey Methods. In the following pages specific nest and nesting habitat characteristics and suggested survey procedures for the various species are discussed and illustrated.

DIURNAL SPECIES NEST SURVEYS

Bald Eagle

(Haliaeetus leucocephalus)

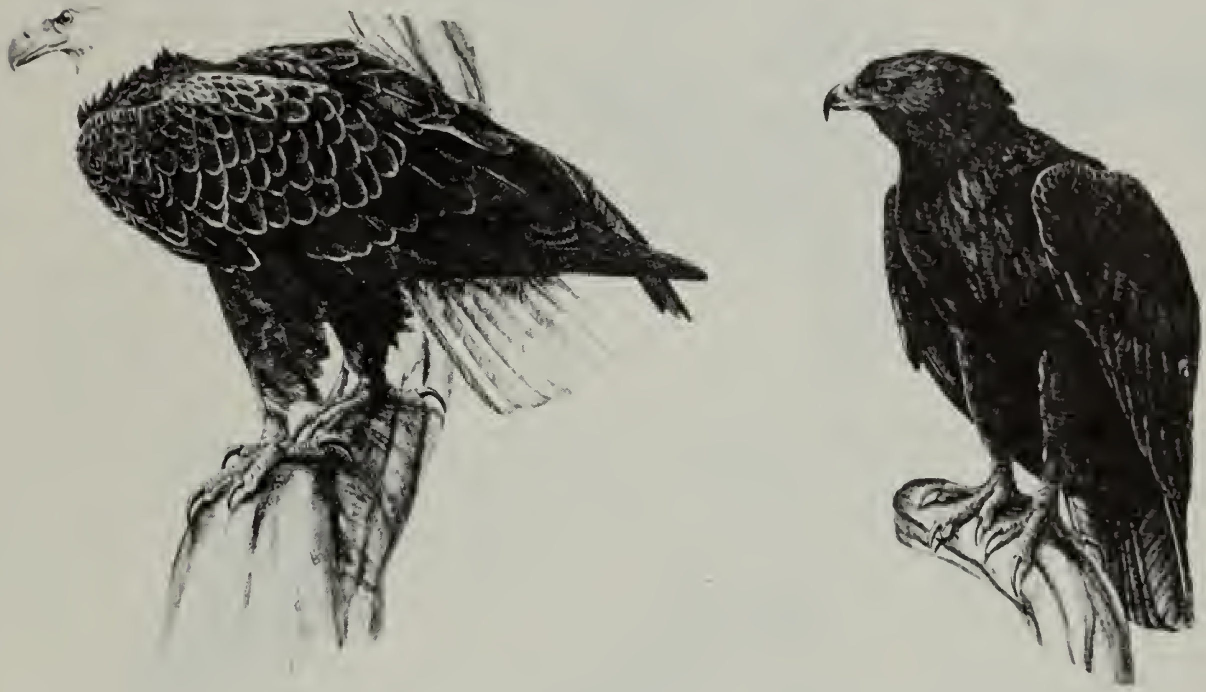


Fig. 1. Mature and Immature Bald Eagles.

Nest and Habitat Characteristics

Bald Eagles may nest on projections or ledges of cliff faces or on trees protruding from rock cliffs along seashores; in the tops of cottonwoods or other large deciduous trees where these are the predominant trees along waterways; or in the tops of conifers where these trees are the dominant species along waterways or around lakes. The tree species selected for the nest is not as important as the tree's total height and size. The tree selected is characteristically the largest or stoutest in the immediate surroundings. Researchers have observed that the average diameter of cottonwoods used for nesting is 24 inches; the average height of the nest above the ground is 50 feet; and the tree height above the nest averaged 23 feet. In three separate studies in Wyoming and Alaska the average height of coniferous nest trees was 114 feet, with the nest being placed within 25 feet of the top. Many nests were built in dead or dying trees.

Freedom from human disturbance or intervention is one of the most variable factors involved, but they do not *normally* begin a nest where human disturbance is evident.

In areas where ospreys are also nesting, there may be some difficulties with nest identification. Eagles usually nest near large water bodies or streams, but ospreys frequently nest near small potholes or beaver ponds. The eagles *almost* always nest in live trees, although sometimes the tops of these trees may be dead. The *majority* of osprey nests in trees are in dead trees. Eagle nests are *usually* located below the crown at a main branch and *usually* receive some cover from the part of the tree above the nest. Osprey nests are often located at the very top of the tree. Eagle nests also tend to be larger than osprey nests, flat topped, and somewhat cone shaped. Osprey nests are basically more rounded in appearance. The size of Bald Eagle nests ranges from a depth of two feet and a diameter of six feet to nests eight feet deep and as much as twelve feet in diameter. These are among the largest nest structures for any bird of prey in North America. (7).

Nest Survey Methods

The preferred method for surveying Bald Eagles is with slow-flying light aircraft, flying down drainages and around lake shores about 500 feet above the tree tops (or closer). Helicopter or fixed-wing aircraft should be flown on days of excellent visibility with overcast days being avoided. The survey should be conducted during the mid-portion of the day, or when the search area has direct sunlight. The adult birds are more apt to be near their nest site during the middle portion of the day. Watching for perched or flushed eagles and noting their exact locations will give a good indication of the approximate location of the nest. Once adult or immature birds are located, several passes, or a return trip on foot or boat, may be necessary to locate the nest site. (17). The reliability of all aerial surveys depends largely on the observers' experience with raptors and his flying experience. In most cases it is desirable to make at least two passes *down* a drainage, one on each side of the stream while watching for the most prominent trees within one-half mile of the river. Along the rocky cliffs and steep shorelines of Alaska, more than one flight altitude may need to be flown in order to adequately observe all possible nesting sites along the cliffs. Nests are occasionally found on ridges, but most nest sites are below the tops of major ridges.

Boat surveys are probably the most effective and cheapest methods to search for eagle territories and nests. The boat should travel at low speeds, approximately 30 to 60 yards from shore. The observer should be in a position to "skyline" the nest. Several passes may be necessary to adequately search an area. (17).

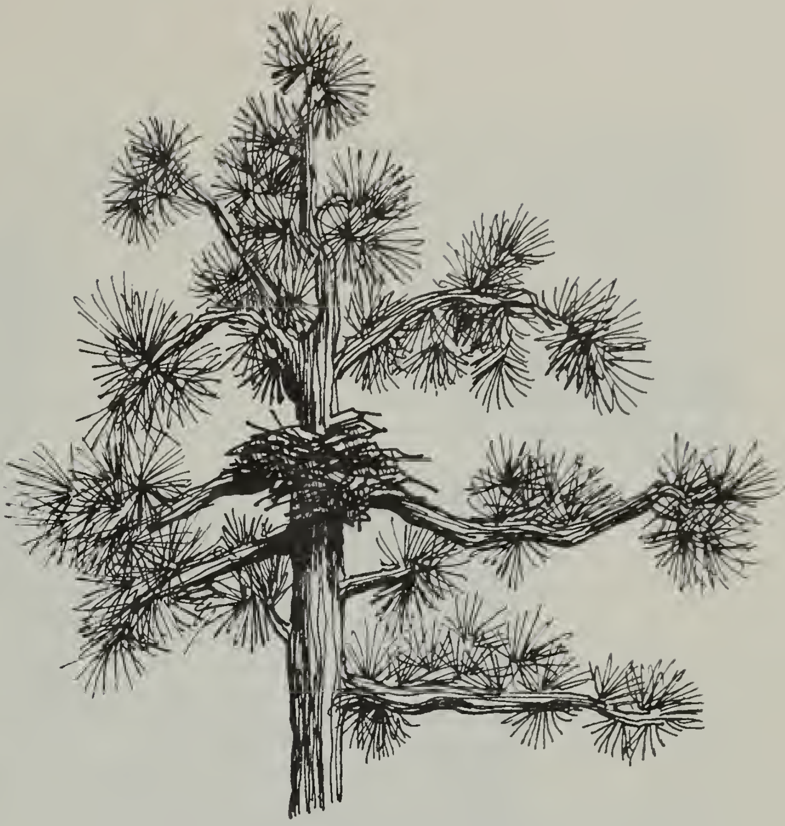


Fig. 2. Bald Eagle nest in normal tree, mostly hidden by foliage.

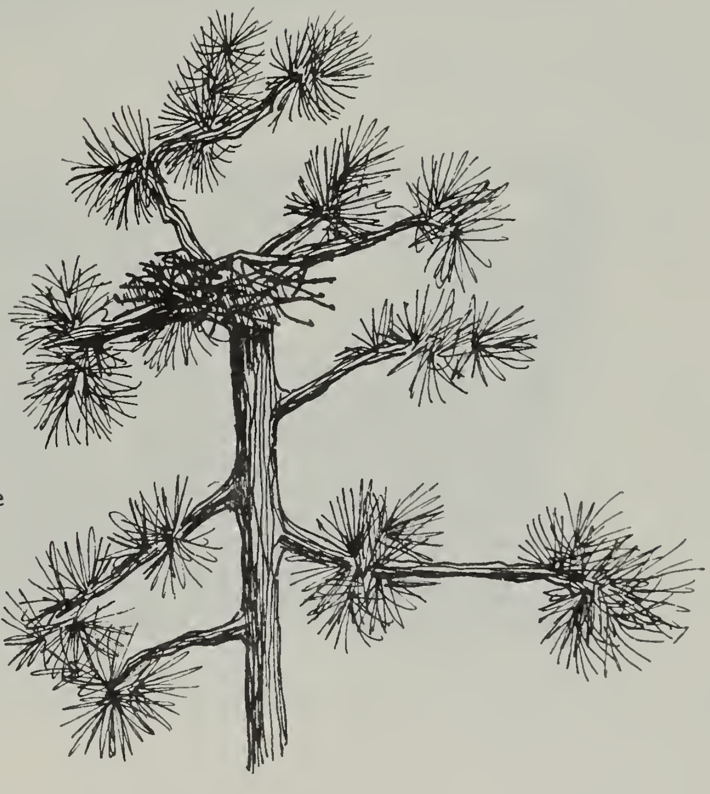


Fig. 3. Bald Eagle nest in bowl formed after tree top was damaged.

Surveying for bald eagles without the use of aircraft is extremely time consuming and relatively unreliable. Where roads run up stream bottoms, they may be used to good advantage, but nests away from the riverbanks are frequently missed by observers on the ground.

Comments:

Bald Eagles have been known to defend their eyries actively when disturbed by man. This is in contrast to the Golden Eagle that usually leaves the vicinity when its nest is approached.

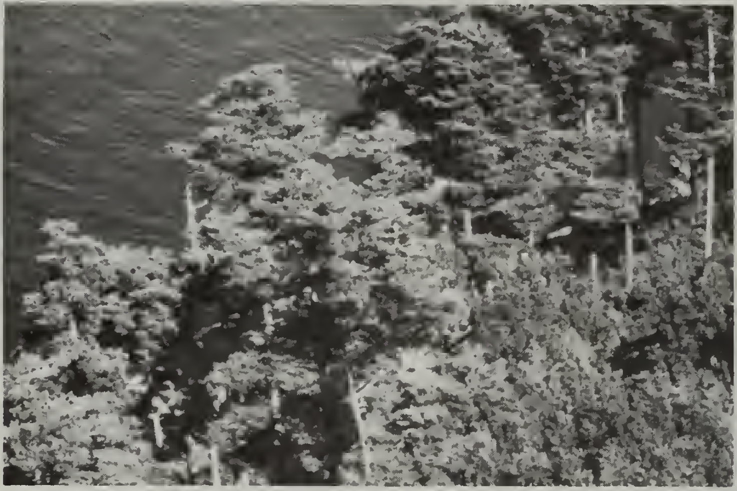


Fig. 4. Typical nesting habitat of Bald Eagle, with nest in top of conifer.

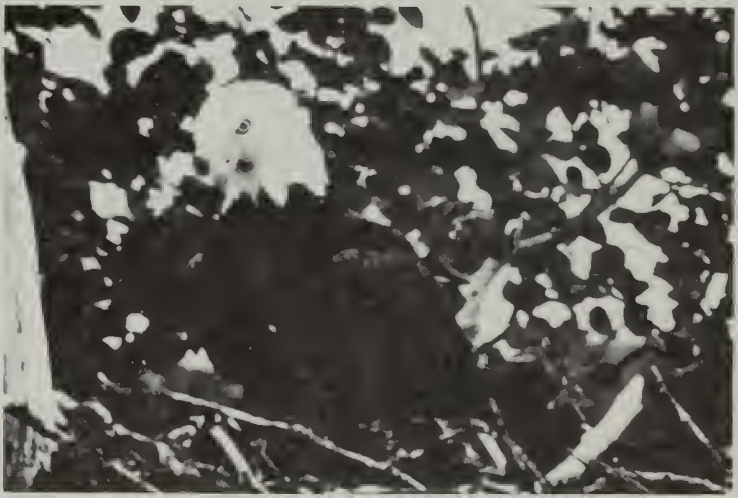


Fig. 5. Bald Eagle at nest, showing general nest structure and location in tree.

Golden Eagle

(Aquila chrysaetos)

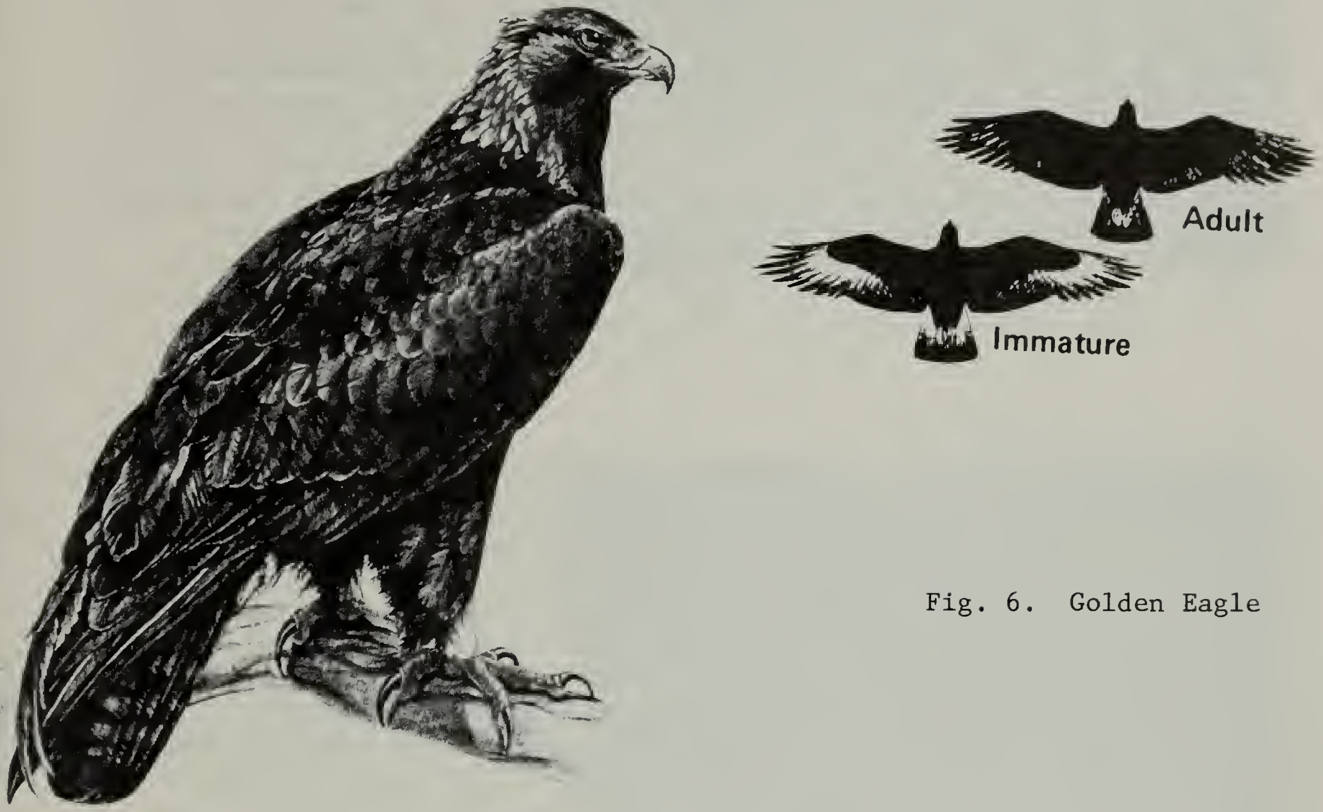


Fig. 6. Golden Eagle

Nest and Habitat Characteristics

Most eagle eyries are located on cliffs, although in some situations tree nests are fairly common. Nests may be located on the ground or on cliffs as high as 400 feet, or more. Tree nests have been located in Douglas fir, cottonwood, ponderosa pine, juniper, sycamores, eucalyptus, redwoods, oaks, and dead snags. The height of tree nests may vary from 10 to 100 feet above the ground. Cliffs chosen for nest sites tend to be relatively inaccessible, although some nests can be easily reached. (6).

Golden Eagle nests generally can be seen from some distance, appearing as dark objects on shelves or ledges on cliff faces. In most instances, a patch of whitewash from excretion is also visible. This characteristic is particularly useful for spotting eagle nests from the air. The rock surrounding an eagle nest may be covered with an orange foliose lichen, which is useful in detecting eyries. Many nests are protected by overhangs and are on cliffs which permit an extensive view of the surrounding countryside.

Golden Eagles commonly use alternate nests in different years. Some breeding pairs seem to use alternate nests in alternate years, others never use alternates, even though they spend time repairing all of their nests, and birds which are unsuccessful in their nesting attempt at one nest may use another nest the following year. Any eagle nesting surveys must take the useage of alternate nests into account. New "greenery" is an indication that a nest is being used by eagles.

The large size of eagle nests is an important clue as to the identification of the birds using a particular nest. Their nests average consistently larger than any Buteo nests, often being eight to ten feet across and three to four feet thick, or more. Tree nests tend to be deeper and more massive.

Nest Survey Methods

Golden Eagle nests may be readily surveyed from the air using light aircraft. Nests are more likely to be found on the lower half of mountains that contain cliffs from top to bottom. In extremely rough terrain or when wind velocity exceeds 15 knots, helicopters are more effective than Super-Cubs or other fixed-wing aircraft. Only experienced pilots having a good understanding of their aircraft capabilities at various altitudes (density), knowledge of the peculiarities of mountain air flows, and experience in low altitude mountain flying should be employed for these "close in" surveys. Such nesting surveys will normally be flown within about 200 to 300 feet of the cliff faces. These aerial nest checks are much faster and less costly than equivalent ground checks, but they do not allow the observer to gather additional information such as nestling weight, prey remains, etc., nor allow for photographs of the young. (16).

If surveys are timed so as to be conducted when the young are still white and downy, they can be seen from considerable distances. Also, when the birds develop their dark wing and body feathers from two to four weeks prior to fledging, they appear as large dark objects against cliff faces or amongst the branches of nesting trees. A wide range in cliff heights are acceptable for nesting by Golden Eagles. For aerial surveys it is advisable to fly slightly higher on the cliff face than one expects to find the nests so that he will be looking at an angle downwards at prospective sites.

Comments

Golden Eagles are generally unaggressive at the nest site and frequently fly off some distance when intruders approach. However, both eagles and falcons have been known to attack aircraft and can cause serious damage.

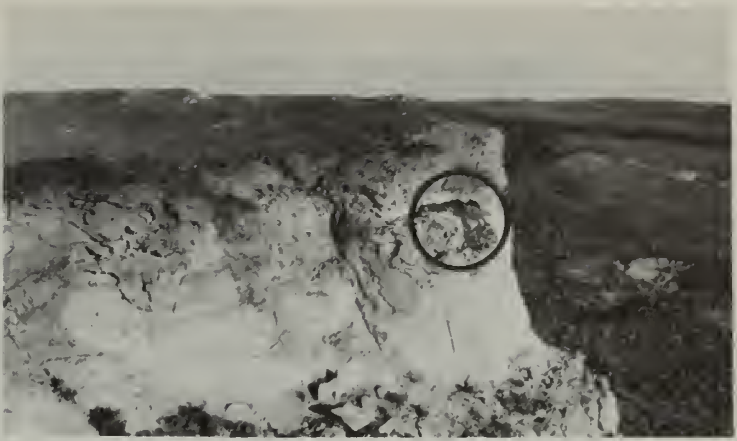


Fig. 7. Typical Golden Eagle nest on ledge in upper right portion of rocky projection in central Wyoming. Two large eaglets are on the nest. Note open hunting terrain.

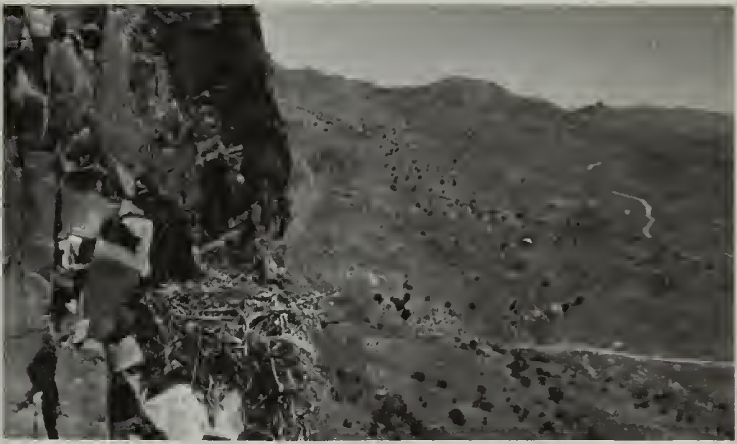


Fig. 8. The most typical Golden Eagle nesting site is on a projection on a sheer cliff face. Open hunting terrain extends in three directions from the cliff.

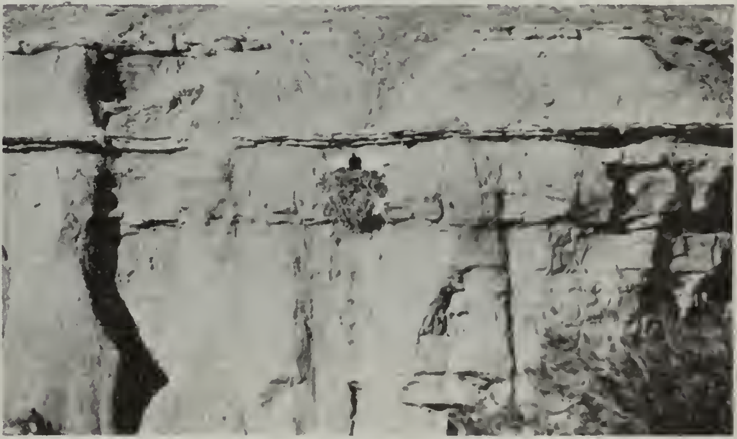


Fig. 9. Golden Eagles will frequently nest on rocky or clay protuberances on steep sided canyon walls that are common along western rivers

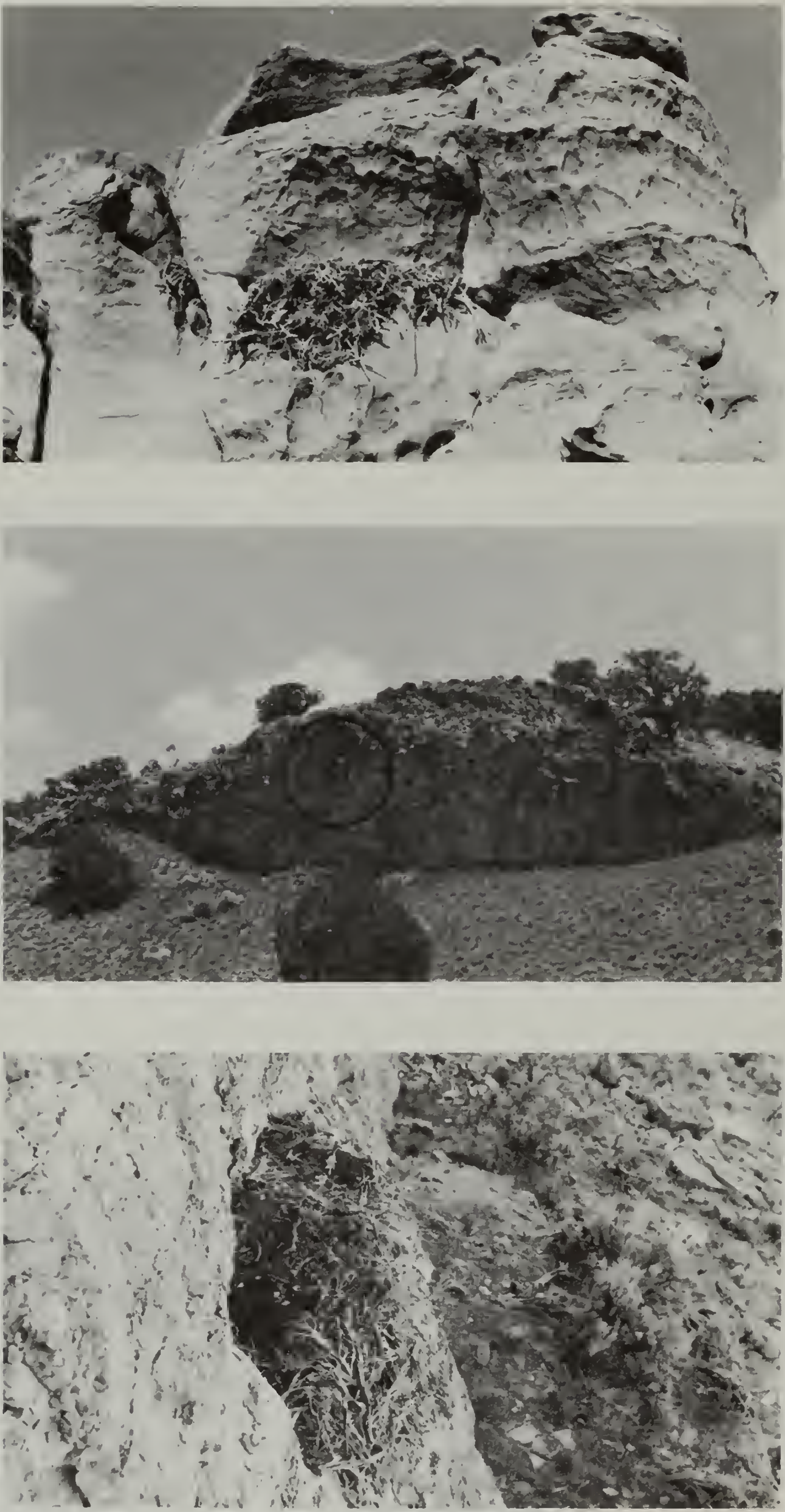


Fig. 10. Low, rocky cliffs are commonly utilized as nesting sites by Golden Eagles throughout the West. Most sites receive at least a little shade during the hot hours of the afternoon.

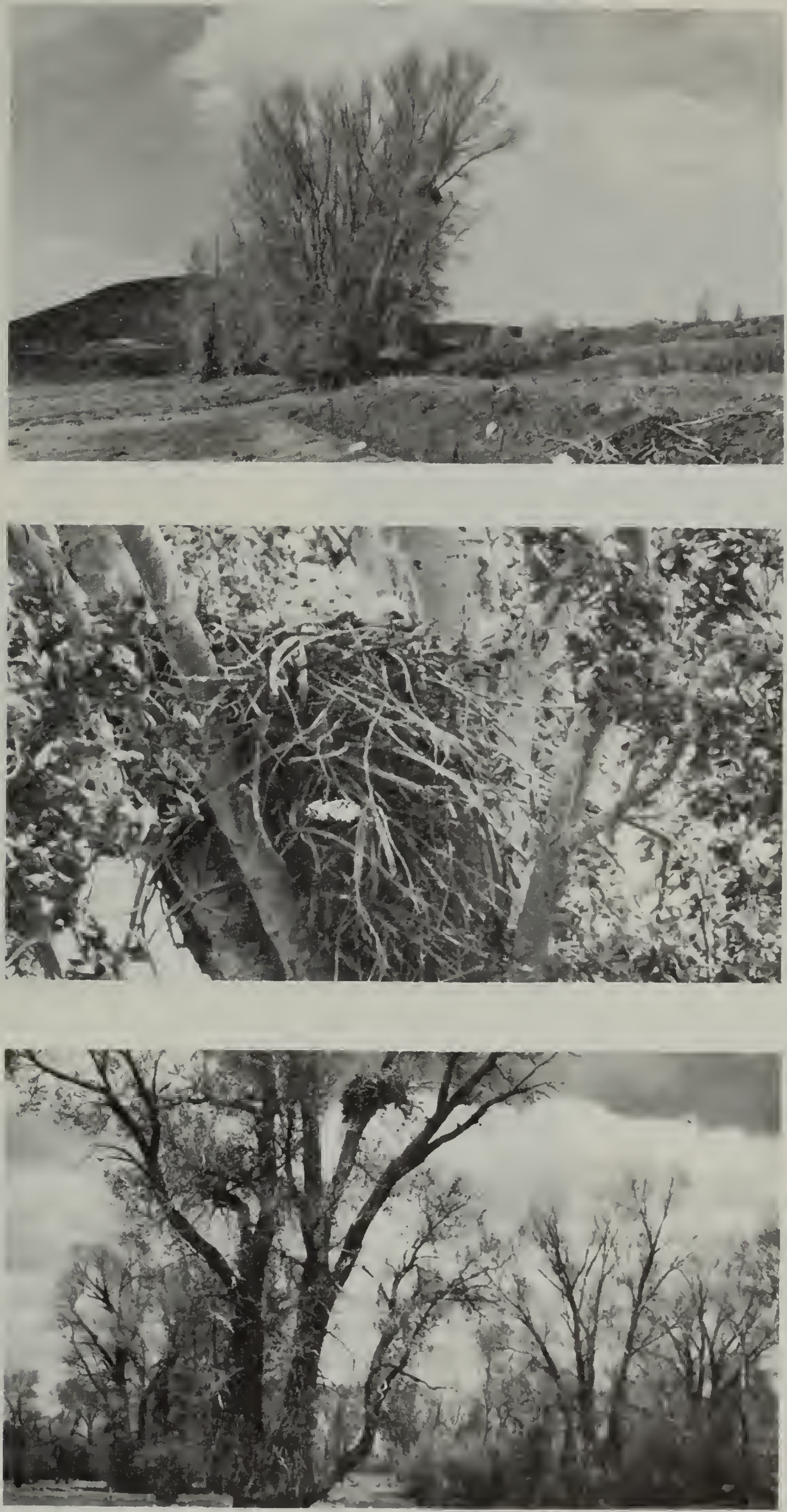


Fig. 11. As depicted above, cottonwoods and other large trees are sometimes used for nesting sites by Golden Eagles.

Fig. 12. Rocky pinnacles are sometimes used as nesting sites by Golden Eagles, but nests built this close to highways are not often successful.

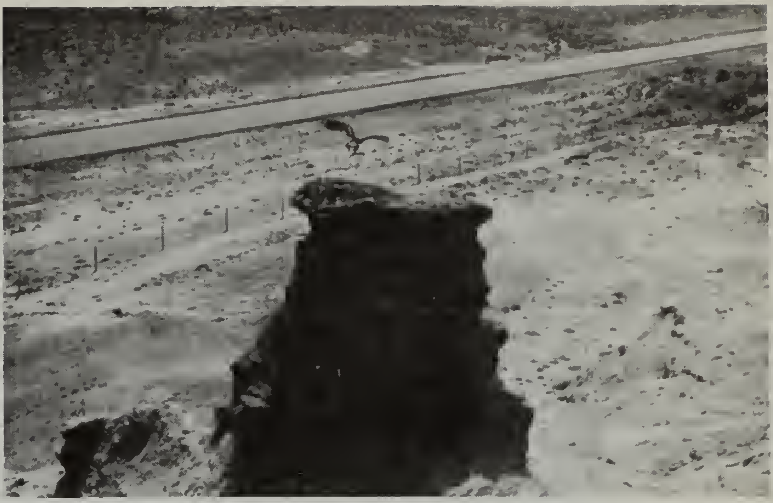


Fig. 13. Golden Eagles infrequently nest on the ground; when they do it is usually on top a bluff or point of a ridge.

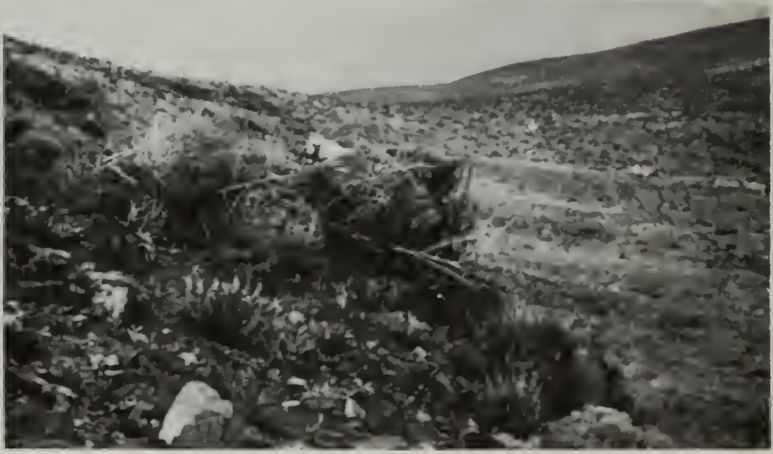


Fig. 14. These Golden Eagle young are ready to fledge. If suddenly alarmed, they may take to flight and in landing may damage bones or other parts of the body. An effort should be made to not fledge birds prematurely, or before they are physically or mentally prepared.

Osprey

(Pandion haliaetus)

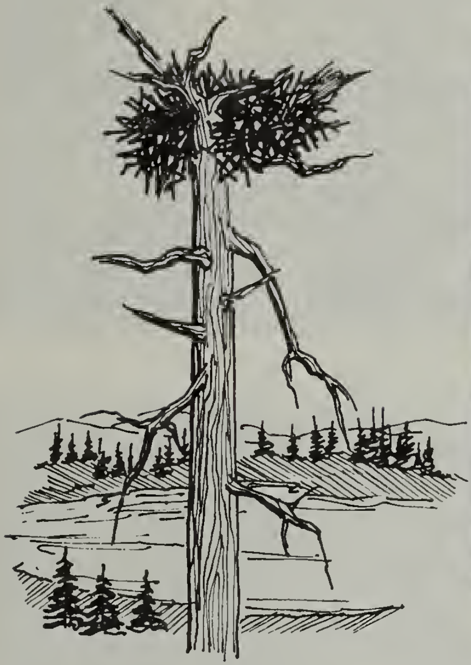


Fig. 15. Typical Osprey nest.

Fig. 16. Osprey landing on nest on dead snag.

Nest and Habitat Characteristics

Ospreys may nest on rocky or dirt pinnacles, in the tops of dead snags, or in the tops of live trees. The tops of dead snags are the most common nesting site along rivers and around lakes of the Northwest, but rocky pinnacles are commonly used in some western states. Dead snags surrounded by water are preferred but in their absence Ospreys will utilize tall stumps, pilings, and even telephone poles and other artificial structures in proximity to a body of water. If nesting sites are in short supply they may nest a mile or more from water if the food supply proves adequate. The nest site should provide both security and good visibility. (11).

Completion between Ospreys and Canada Geese for nesting sites sometimes occurs. Since the geese arrive on the breeding grounds earlier, they may usurp nests traditionally used by Ospreys. Ospreys occasionally drive geese from these nests, but otherwise probably construct new ones.

Ospreys prefer to build their nests near accessory perches. They will utilize almost any elevated structure as a perch for sunning and protection from wind provided it remains within sight of the nest. The same nest site is normally used year after year, or as long as the tree remains standing. Nesting materials consist of large sticks, driftwood, and grasses or bark. Nests are most often constructed in the tops of conifers, but deciduous trees may also be used.

Fig. 17. Osprey nests are often constructed on top rock or clay pinnacles on the shores of lakes or rivers. This nest is on a rock pinnacle high on a canyon wall in Utah.

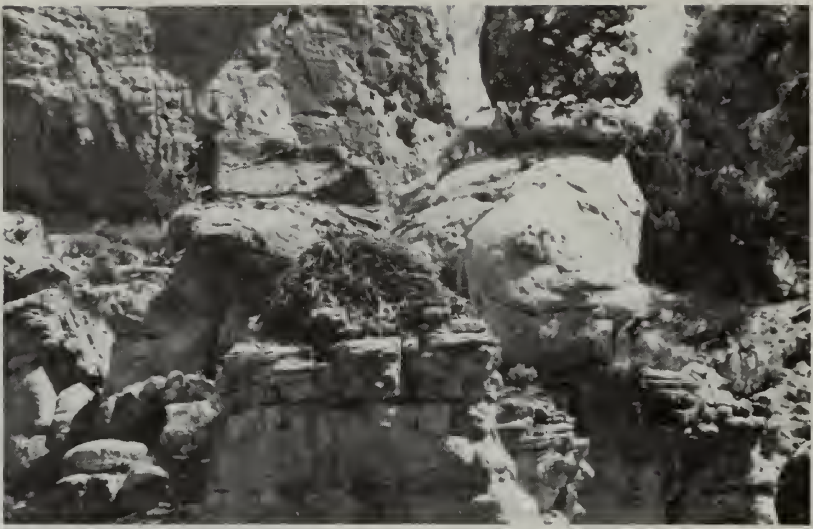


Fig. 18. This nest, containing one egg, shows typical nest structure for Ospreys. Nests are usually within one-quarter mile of water.

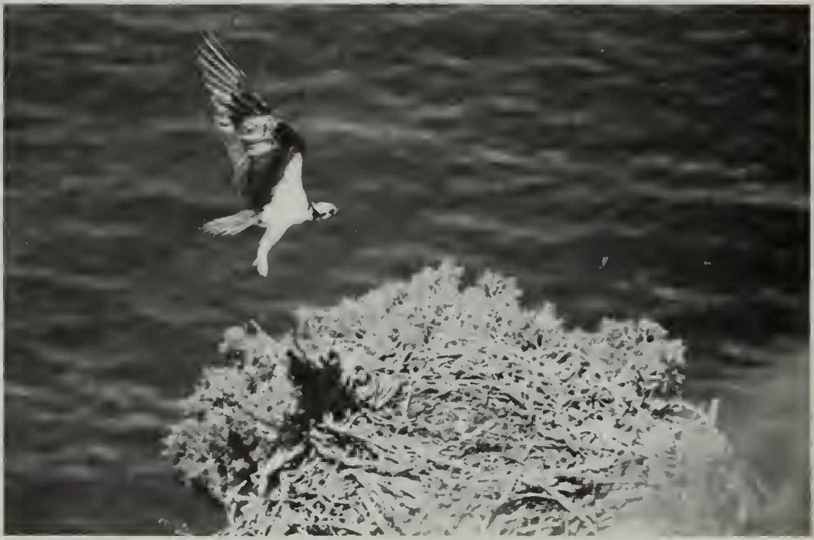
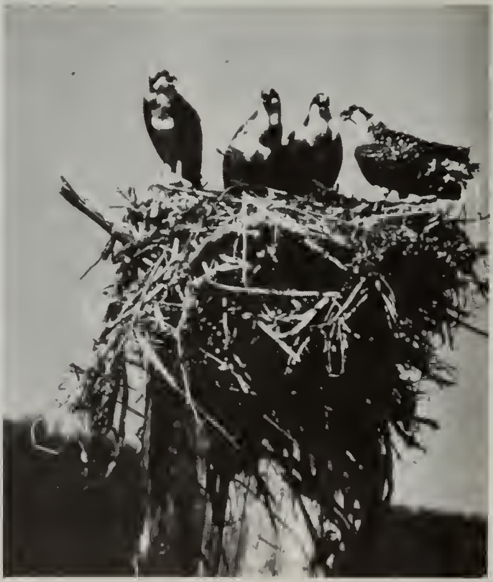


Fig. 19. Young Ospreys on nest atop dead snag.



Nest Survey Methods

Nesting surveys for Ospreys are much the same as for Bald Eagles. Light aircraft or helicopters are normally used to cruise the shorelines of lakes and rivers, while closely observing the tops of all snags or broken trees and any other pinnacle-like structure that might be used for nesting. Surveys should not be conducted during cold, rainy, hot, or windy weather because of potential adverse effects on the young if the adults leave the nest, and helicopters should not be hovered over the nest.

Comments

This species may violently defend its eyrie and young from molestation by man or animals by actually attacking the climber and intruder. Ospreys can inflict severe blows, and many individuals who have attempted to ascend to the high, tree-top eyries have been nearly knocked to the ground. A few have received such resounding blows on their heads as to render them unconscious for a few seconds in a dangerous situation.

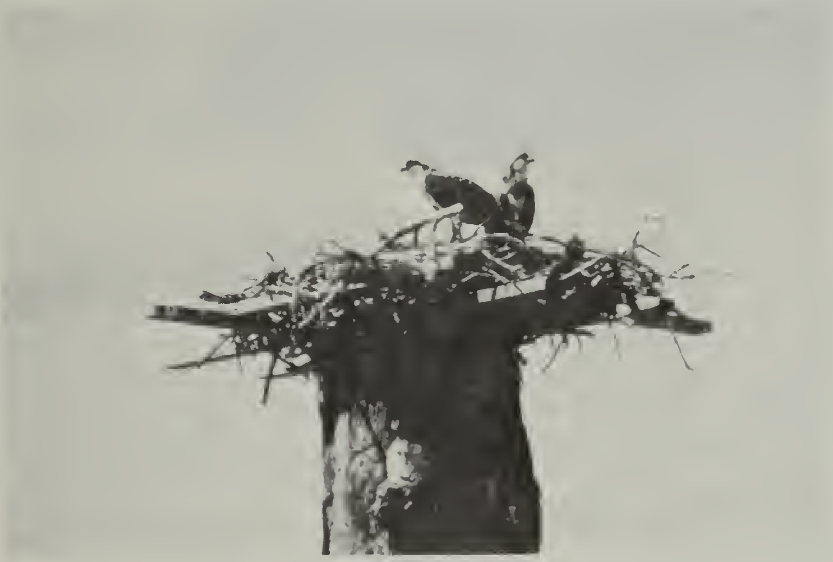


Fig. 20. Ospreys will readily utilize man-made nesting platforms placed in suitable locations around the edges of lakes or reservoirs. Artificial nesting platforms can maintain Osprey populations in areas where natural snags in impounded areas gradually die and fall down.

Peregrine Falcon
(Falco peregrinus)

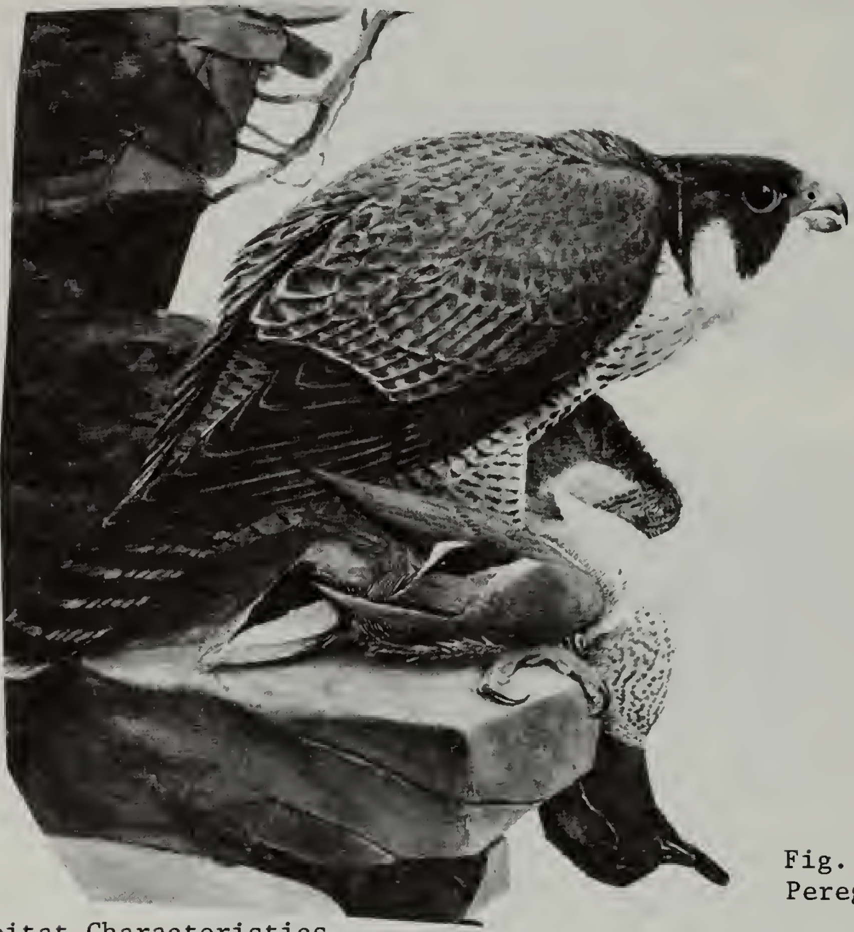


Fig. 21.
Peregrine Falcon

Nest and Habitat Characteristics

The vast majority of the Peregrine eyries in the Rocky Mountain Southwest region are within 1 mile of a stream or river. Such situations often provide lowlands rich in bird life and open areas over which to hunt. The walls of canyons and gorges are often used for nest sites. A few nests have been found away from major stream courses, but generally these have been associated with extensive oak bushland, pinyon-juniper woodland, or mixed coniferous forest. In the central part of the region there are very few records of Peregrines nesting above 9500 feet elevation.
Along the Pacific Coast Peregrines utilize nesting holes or ledges on cliffs and rocky islands.

The most frequently used nesting cliffs exceed 100 feet in height, are often at the top of a high talus slope, and have ledges or caves with gravel or soil in which a depression can be scraped for eggs. Cliffs with at least some southern exposure are preferred in the northern part of the region, but near the Mexican border, north-facing cliffs may be used. Generally, the higher the cliff in relation to adjacent lands, the better.

Nest Survey Methods

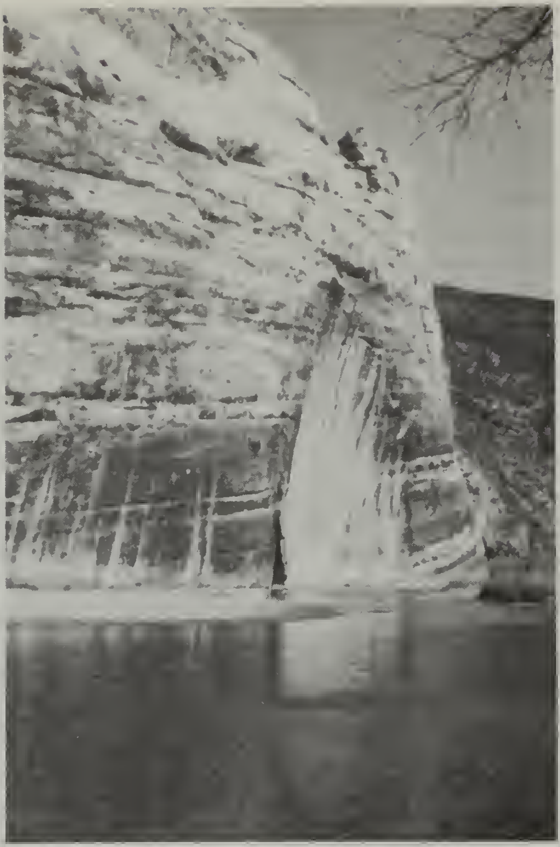
Aerial surveys are generally inefficient in identifying Peregrine Falcon eyries. "Whitewash" may be observed on cliffs but it is very difficult to differentiate between Peregrine eyries and Prairie Falcon eyries. However, if a helicopter is flown slowly across a cliff face where Peregrines are suspected, any birds present may flush from the cliff and can then be observed. In Alaska, where great distances and thousands of miles of streams are involved, aerial surveys are the most practical survey method. Suitable habitat is located from the air and then float trips or ground surveys are utilized to examine the better habitats.

Often one can determine if a cliff has Peregrines by looking for "whitewash" excrement on the cliffs. Usually a few marks, up to six feet long, can be found extending down from favorite perches, usually under an overhang. A spotting scope often makes it possible to see single marks not under favorite perches, the presence of which is usually a sign the cliff is occupied by falcons, either Prairie or Peregrine. Falcon droppings are not splashed outward on the cliff as are eagle and buteo hawk excrement, but run vertically downwards producing long streaks. To determine if Peregrines are present, ordinarily the first approach is to examine a cliff for whitewash. This can best be done with the aid of strong binoculars and a spotting scope. When possible, the top of the cliff should be walked, and occasionally a rock can be pushed over the ledge to flush a hidden bird. Even if the cliff is walked, at least five hours should be spent watching for birds before one concludes none is present. Better yet, return to the cliff on another day or two, and search it thoroughly for birds. A loud hand clap or other sharp noise may be produced which may cause a previously unobserved falcon to flush.

If adults spend long periods on the ledge, eggs or young are probably present. Avoid flushing the incubating or brooding birds suddenly. Do not disturb the birds so that they remain from the ledge for more than about 20 minutes if the temperature is below 60-65 degrees F., especially if a wind is blowing. After 1 June, the young are usually big enough so that they will not chill. Minimize disturbance at the cliff especially during egg-laying in April by relying on a spotting scope for observation. (3).

Comments

Peregrines are very defensive of their nest site and will often circle above a cliff site or in front of the cliff giving a rapidly repeated "cack" and may dive at intruders near the nest.



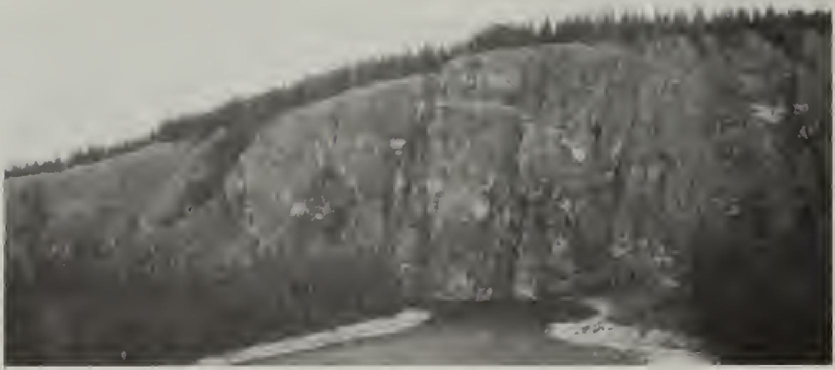
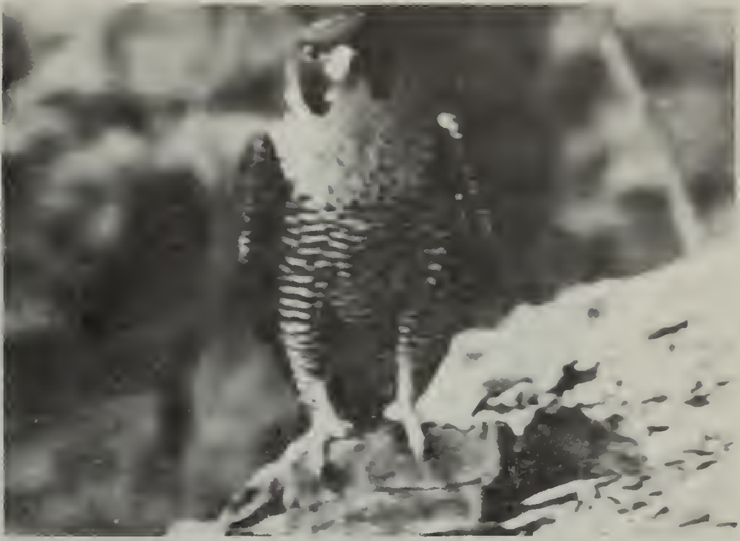


Fig. 22. Ledges or cavities in rock formations are most commonly used as nesting sites for Peregrine Falcons in the West and Southwest, usually in reasonably close proximity to streams or marshes. In Alaska, sloping ridges or hillsides adjacent to rivers are sometimes used in river sections where cliffs are not available.

Fig. 23. Adult Peregrine Falcon near nest.



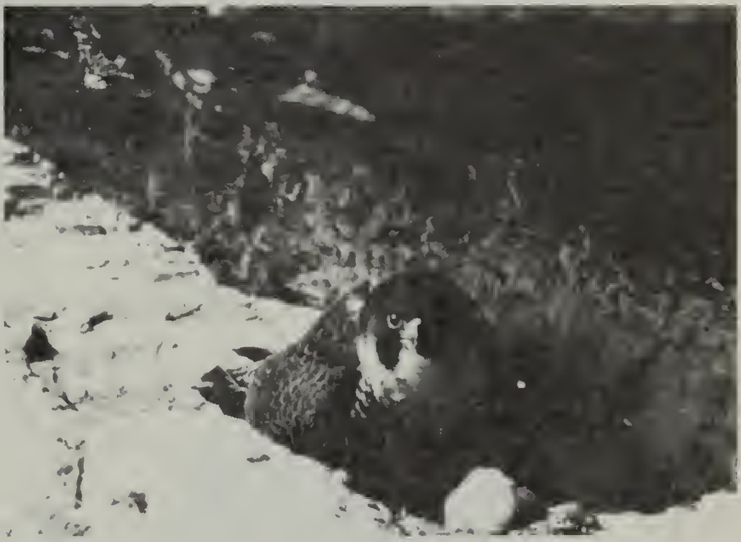
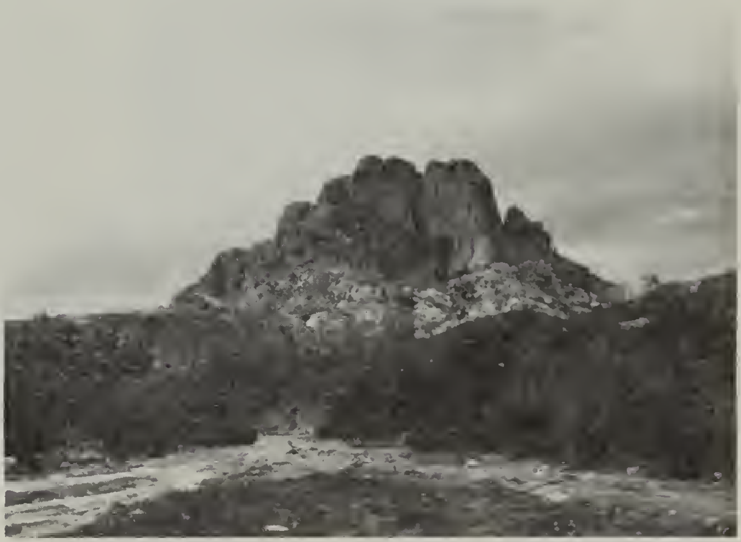


Fig. 24. Peregrine Falcon on ledge with young. The nest consists of only a depression, or "scrape" in which the eggs are laid. None of the falcons build stick nests.

Fig. 25. A typical Peregrine Falcon eyrie. Most Peregrines nest much higher on the cliffs than do Prairie Falcons.



Prairie Falcon
(Falco mexicanus)

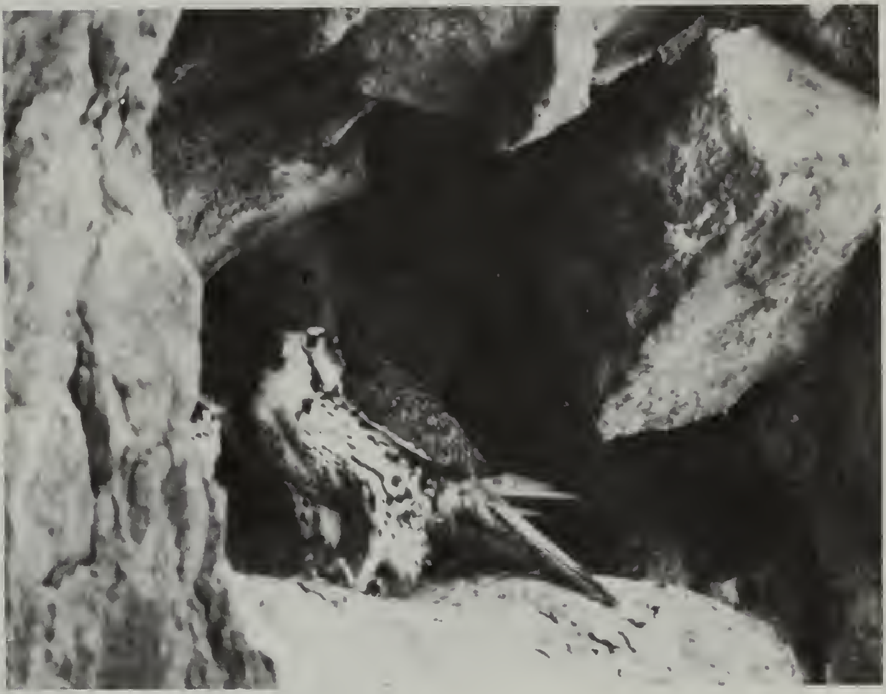


Fig. 26. Prairie Falcon.

Nest and Habitat Characteristics

Prairie Falcons (almost) always nest in crevices or holes in cliffs, which may range in height from low rock outcrops of thirty feet to verticle, 400-foot-high (or more) cliffs. The apparent ideal cliff has a sheltered ledge which provides the site for the eggs, has gravel or loose material on it for the falcon to make a "scrape" or nest depression, and overlooks at least some treeless country for hunting. They will also nest in potholes or larger caves. Prairie Falcons may also use inactive eagle or Red-tailed Hawk nests that are placed in suitable locations on ledges, especially where some overhang is provided, but never build stick nests themselves. (12).

Falcons usually have alternate nesting sites located on the same cliff or adjacent cliffs. They exhibit a tendency to use alternate ledges in succeeding years. Nesting failure does not seem to deter use of the cliff in the following year. Most eyrie sites are located in foothills and open sagebrush areas with suitable rock outcroppings or low cliffs. Holes in clay banks may be used where rock substrates are not available. Prairie Falcons generally tolerate very little human disturbance and abandon eyries where excessive human disturbance occurs.

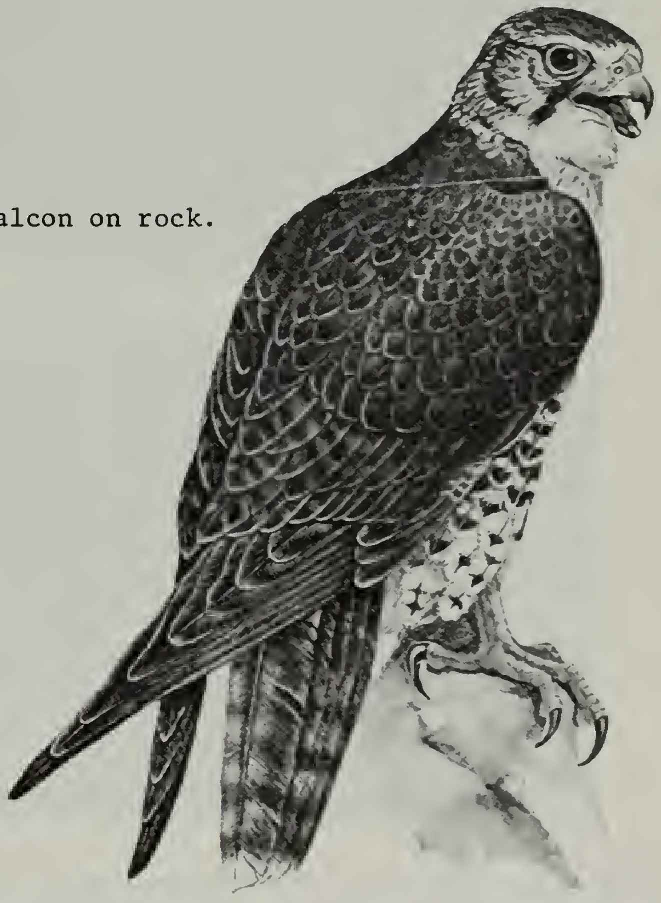
Nest Survey Methods

Prairie Falcons may be readily surveyed from either the ground or from the air by watching for streaks or patches of whitewash (excrement) on cliff faces. While whitewash does not necessarily indicate the presence of falcons, it is almost always present in inhabited areas, either at perches or at the nest site. Some sites, used for many years, receive a considerable build-up of excrement which may be seen for a mile or more.

Comments

Parent birds are extremely vociferous when young are in the nest and the surveyor may be fairly certain that the nest is active when the birds show this alarm. When an intruder approaches the eyrie, the falcon's first defensive move is utterance of its battle cry, a sharp, continuous "jiiik, jiiik, jiiik" that increases in tempo as the eyrie is approached. Then the falcon will burst forth from the eyrie and, with terrific stoops marked by the shrill battle cry, fling herself at the intruder. These stoops are frequently carried to within a few feet of the intruder's head.

Fig. 26A. Prairie Falcon on rock.



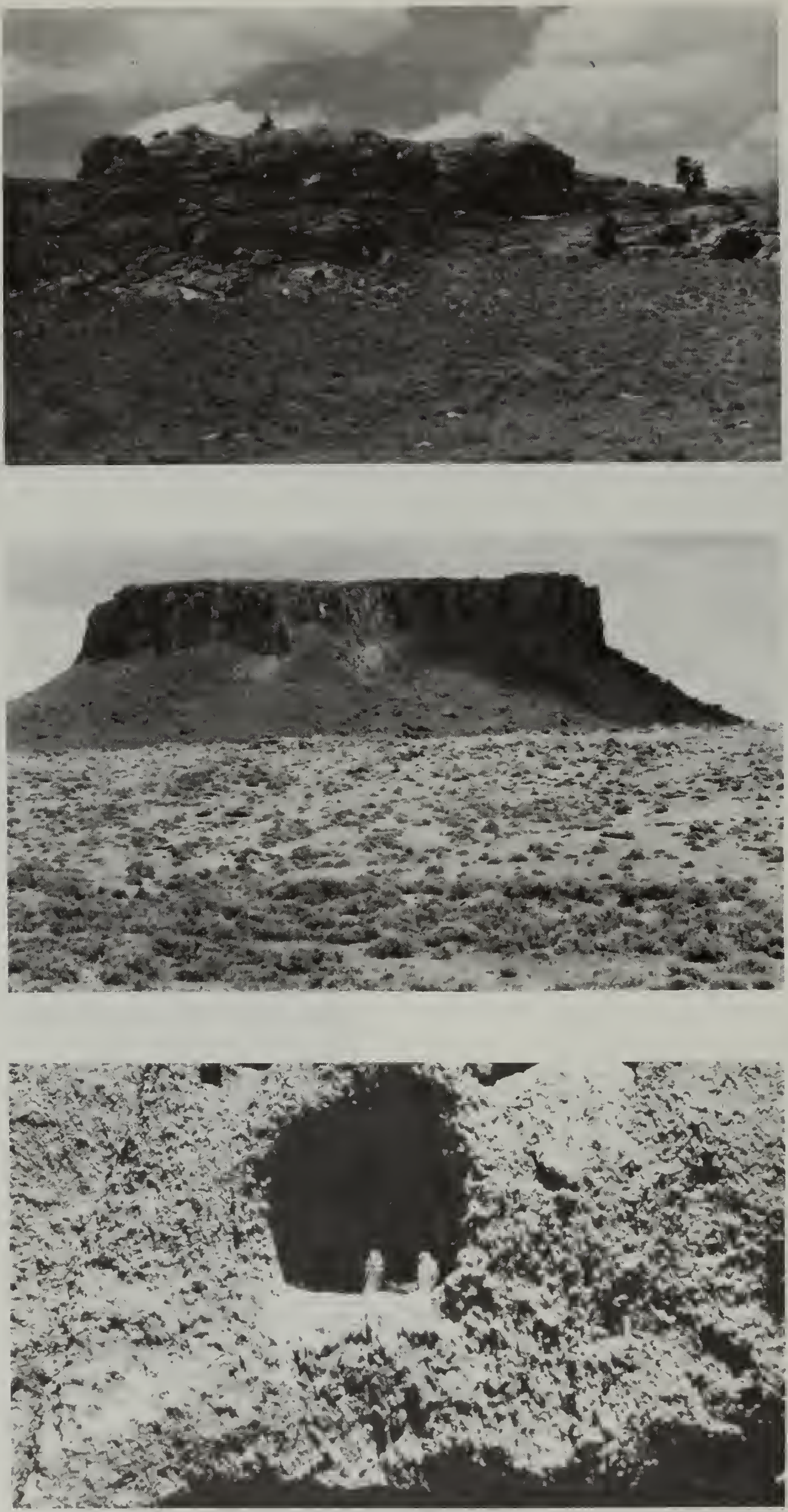


Fig. 27. Typical Prairie Falcon nesting sites. These falcons commonly nest in cavities or on ledges of relatively low cliffs, pinnacles, or clay banks.

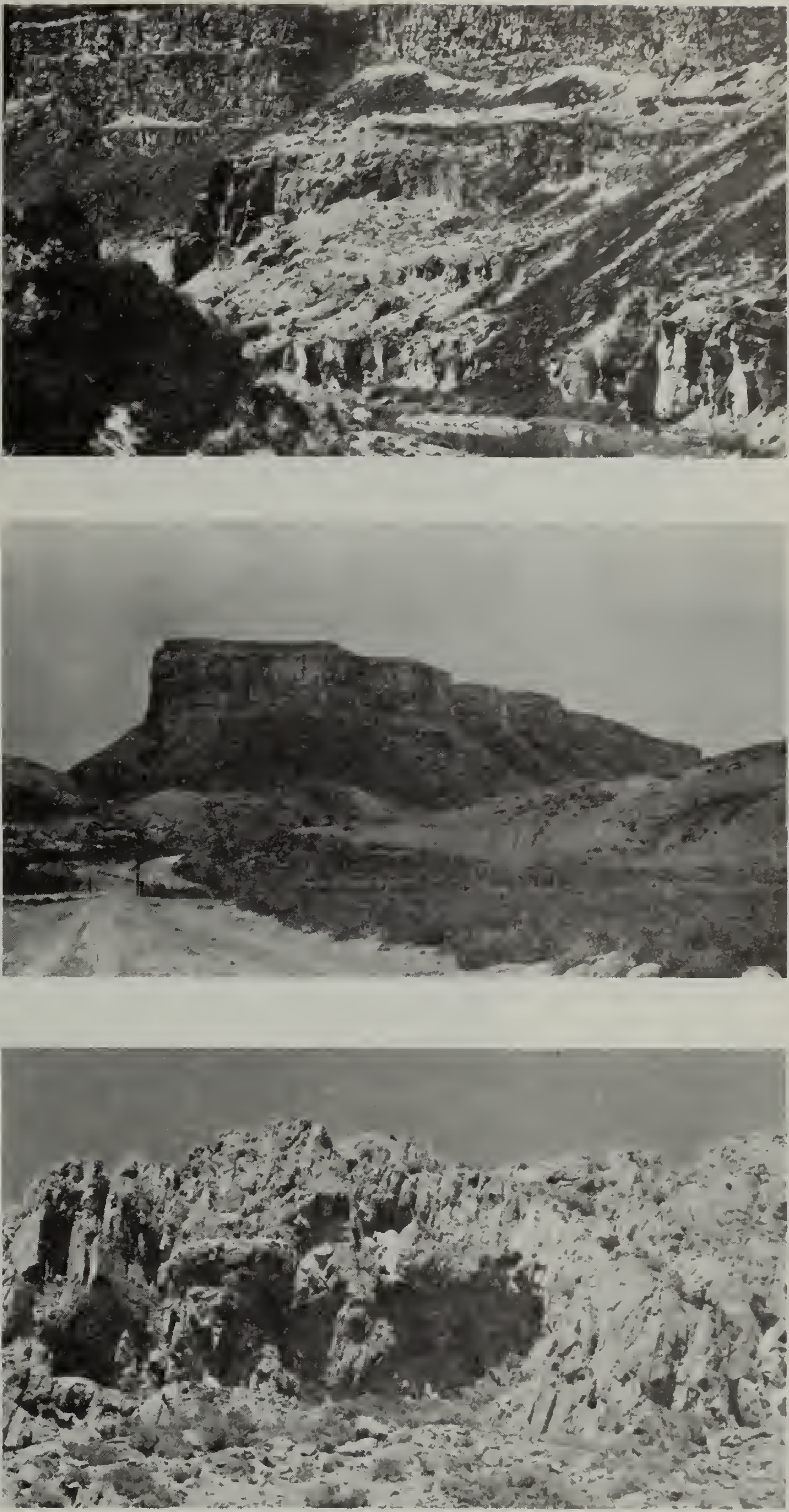


Fig. 28. Fairly high cliffs, such as those in the top two photos, attract many nesting Prairie Falcons. Where rocky cliffs are not available, cavities in relatively low rock formations or cliffs may be used.

Fig. 29. Prairie Falcons lay their eggs in a depression,or "scrape", which they scratch in the bottom of the cavity. The young are free to roam any part of the nesting ledge as they mature.

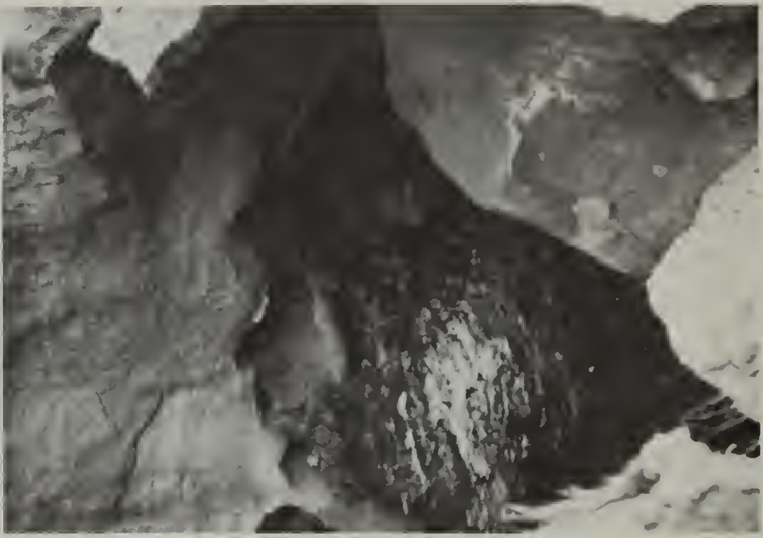


Fig. 30. This prairie Falcon eyrie was an active Golden Eagle nest the previous year. This falcon commonly uses other raptor cliff nests for its nesting site.

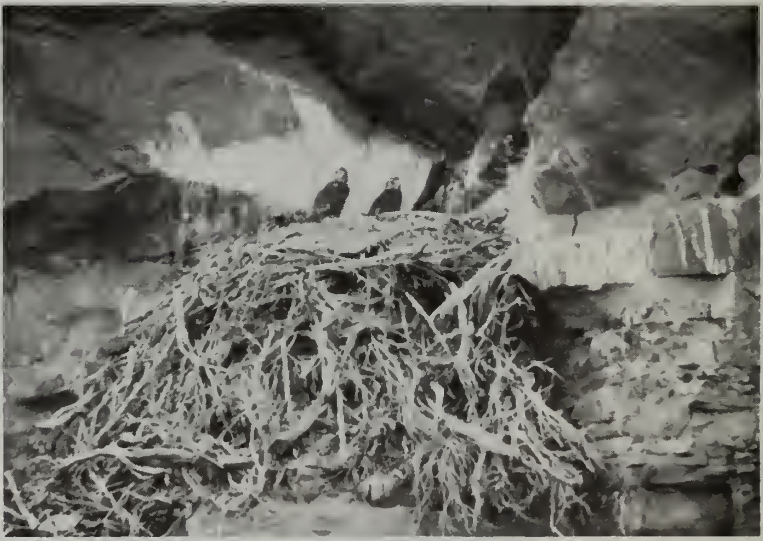
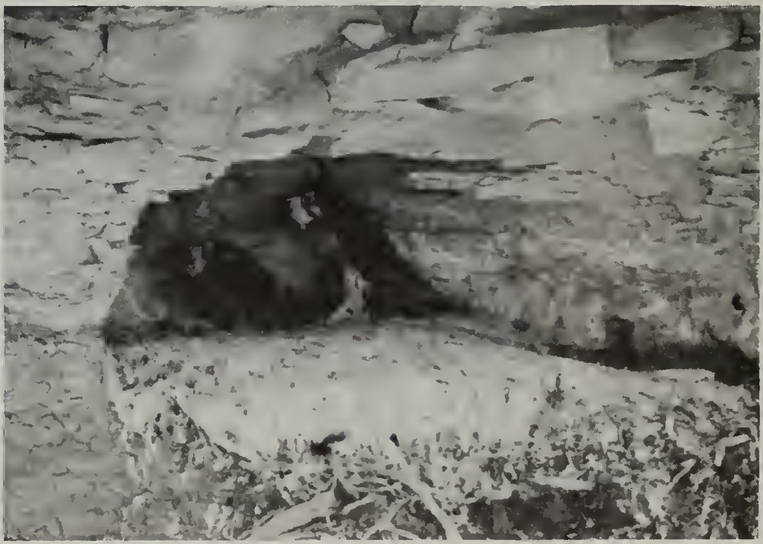


Fig. 31. This old Red-tailed Hawk nest has been used by Prairie Falcons for several years,as evidenced by the heavy layer of excrement on the floor of the cavity.



Gyrfalcon
(Falco rusticolus)

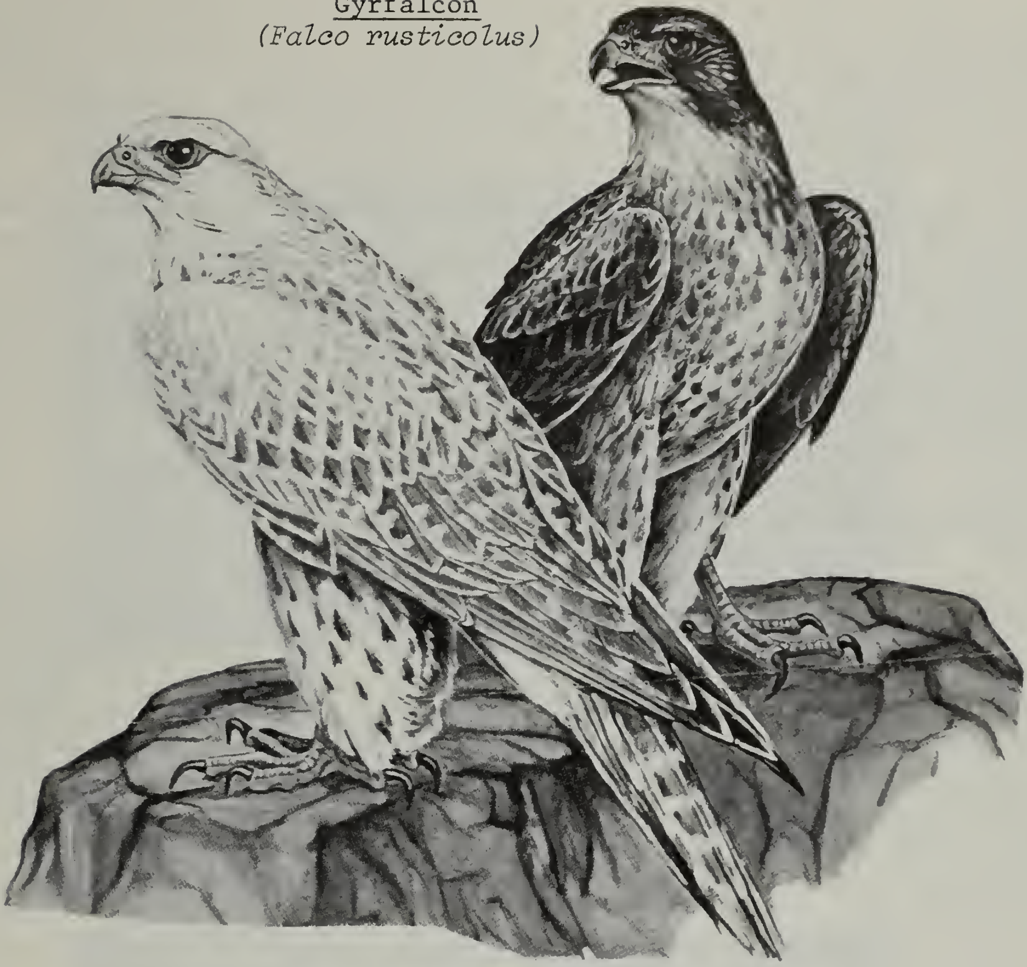


Fig. 32. Gyrfalcon.

Nest and Habitat Characteristics

Gyrfalcon habitat is found primarily in treeless Arctic and alpine terrain at low elevations. It frequently nests above 2,000 feet, but it is unlikely that it nests above 4,000 feet, since its major prey items, resident birds and small mammals are not found above this elevation.

A cliff or bluff is the most important physical feature in Gyrfalcon habitat. The distribution of Gyrfalcons is related to the presence of cliffs, bluffs and rock outcrops of suitable size. On the Seward Peninsula Gyrfalcons are present in areas characterized by many rock outcroppings. Gyrfalcons occupy sea cliffs, river bluffs, and isolated upland cliffs. They frequently utilize old Raven stick nests but never build their own stick nest. A typical Gyrfalcon nest is located on a ledge or platform protected from snow accumulation by an overhanging projection of rock.

The average height of the nest site is about 95 feet (25 to 300 feet); average distance below the brink of the cliff is 44 feet (0 to 200 feet) and the distance above the base of the vertical face averages 50 feet (6 to 200 feet). Nests may be on ledges of precipitous cliffs, in potholes, or on low slopes.

Most nesting cliffs have at least one and often two or more alternate nest sites which apparently are readily used by breeding Gyrfalcons. Nesting cliff tenancy is low on the Seward Peninsula, where nesting sites are abundant. It is likely that "cliff-shifting", the utilization of different cliffs by the same pair of Gyrfalcons, is common. The degree to which this phenomenon occurs is probably influenced by the abundance of suitable nesting sites, prey densities and the number of Gyrfalcons and other species of raptors in an area. (10).

Nest Survey Methods

Gyrfalcons are normally at their nesting site by April. Ground, aerial, or boat surveys should be conducted during April or May to determine occupancy of both potential and known sites. Re-checks of occupied sites should be made in mid-June to determine nesting success and/or productivity. Because of poor access into most nesting areas, the use of helicopters is the most desirable survey method. These surveys may often be conducted in conjunction with other resource management activities. For many surveys a Super Cub or Heliocarrier with tundra tires may be used. Checking of sites for nesting success in June may be done using a Super Cub and making several passes.

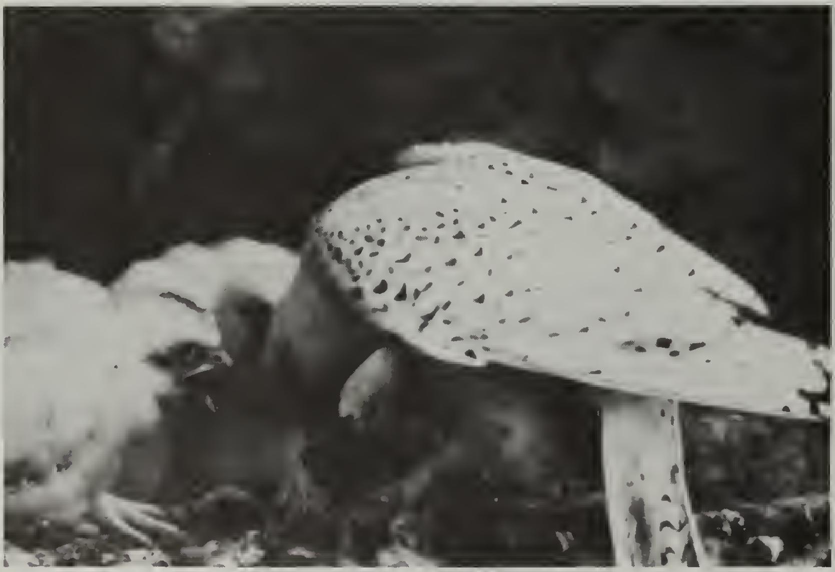


Fig.32A. Gyrfalcon feeding young at nest in Alaska.

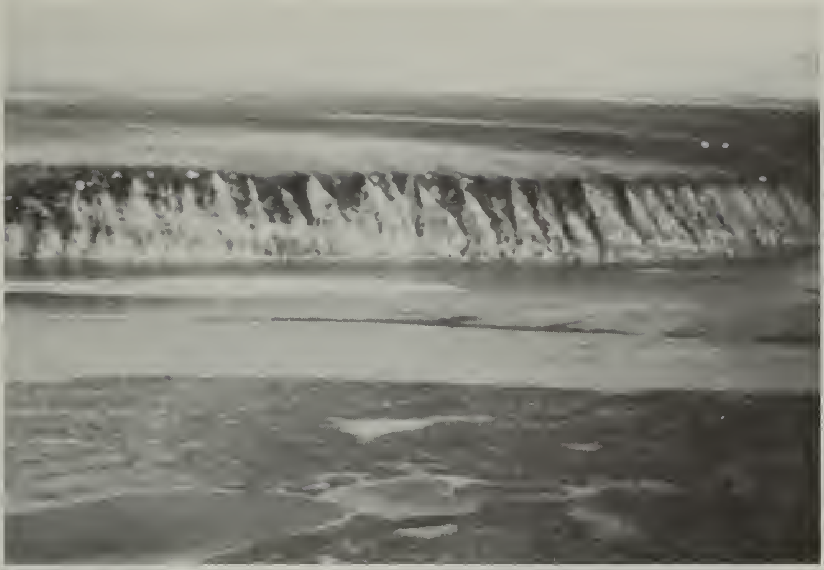


Fig. 33. Gyrfalcons commonly nest on sloping river banks, such as these along an Alaskan river. Surveyors normally concentrate their nest searches on steep river banks or on rocky outcroppings on plain or tundra.

Fig. 34. A typical Gyrfalcon nest site on a rocky ridge. Old Rough-legged Hawk nests are also sometimes utilized.

Merlin
(Falco columbarius)

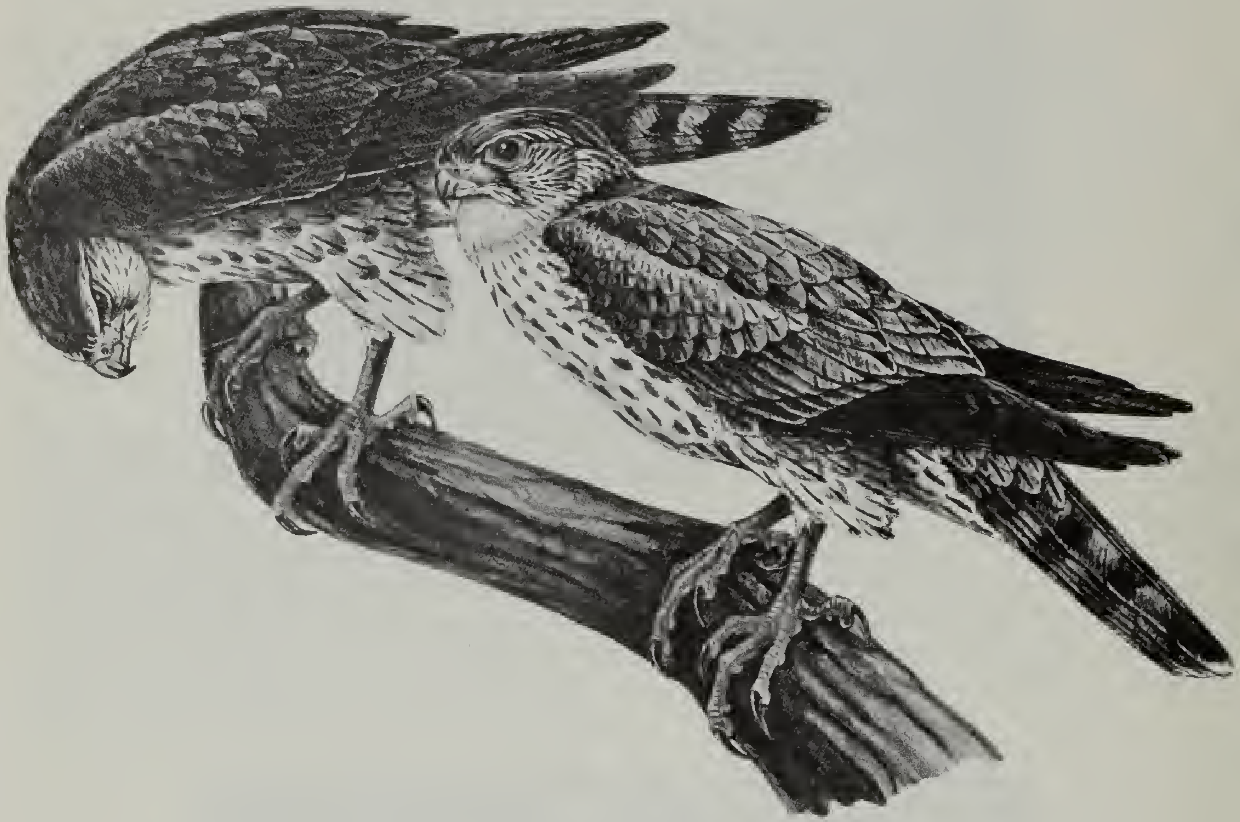


Fig. 35. Merlin (Pigeon Hawk).

Nest and Habitat Characteristics

The Richardson's Merlin, or Pigeon Hawk, breeds primarily in the prairie-parkland of the northern Great Plains with a small population of birds nesting along river bottoms in central Wyoming. Within this area, the subspecies seem to prefer isolated groves of trees with open prairie surroundings, mixed woods, and wooded areas along prairie river banks and islands. (14).

In the southern areas of the open grassland, Richardson's Merlins nest most frequently in deserted Crow and Magpie nests, and seem to have a preference for the latter. Their nests have been found in a variety of deciduous and coniferous trees, but the key determinant for the nest site seems to be the type of old nests available rather than the species of tree where it has been built. They have been found to nest most commonly in deciduous trees, but in areas where Crows and Magpies nest in conifers, Merlins will then nest in these nests. The prairie subspecies occasionally nest in tree cavities and in old Magpie nests placed in holes in cliffs. Nests are usually lined with dry inner bark of poplars. A few observers have recorded Richardson's Merlins nesting on the ground.

Nest Survey Methods

Merlin surveys need to be done from the ground or by boat along river bottoms. The birds may be easily confused with kestrels at a distance, but the call and flight pattern are usually distinctive. The surveyor should examine all likely looking habitats on foot, preferably when young would likely be in the nest. The alarm calls of the adults, especially the female, can be heard at some distance and indicates the presence of a nest. Nests may be located from boats as they drift along the shorelines of prairie rivers if the birds have nested sufficiently close to the banks to be alarmed at the boat's passing.

Fig. 36. Female Merlins stay close by the nest when humans approach. Their frantic call leaves little doubt that an active nest is nearby.

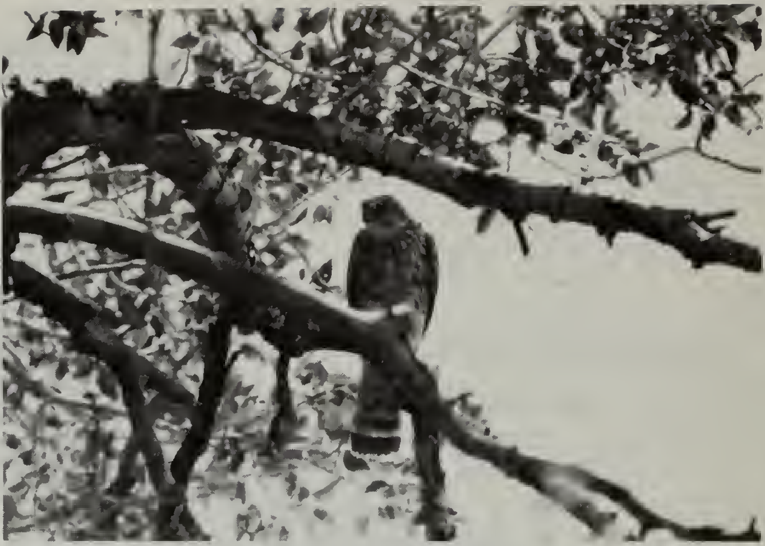


Fig. 37. Old Magpie nests are common nesting sites for Merlins. This nest is in a tall cottonwood tree, but Merlins have also been reported to use Magpie nests constructed in junipers.

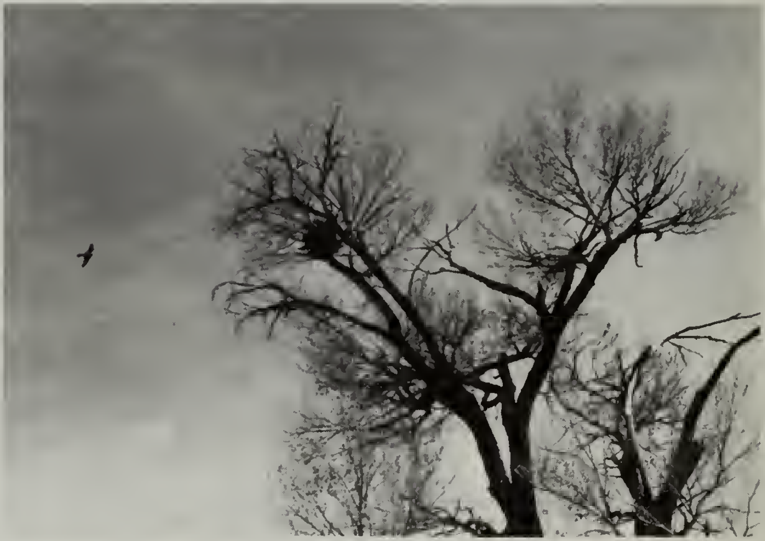
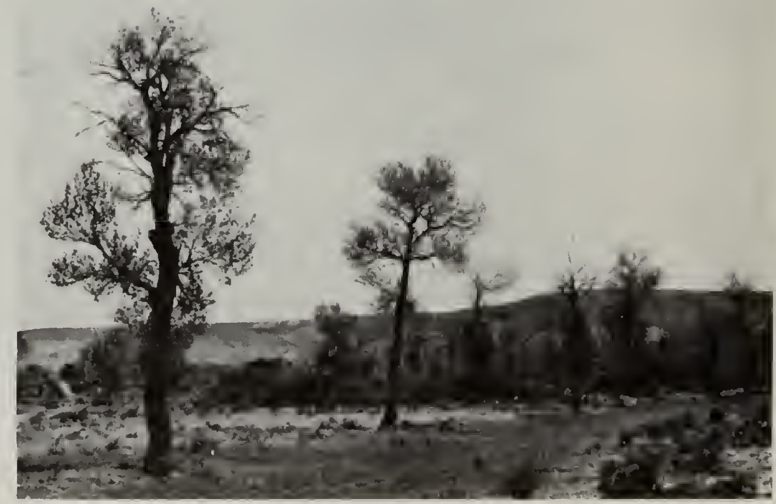


Fig. 38. Parks with scattered trees, or a savannah-type habitat seem to be preferred by Merlins in some states. They occupy essentially the same areas as Kestrels along river bottoms, but they prey on different forms of wildlife.



Kestrel
(Falco sparverius)

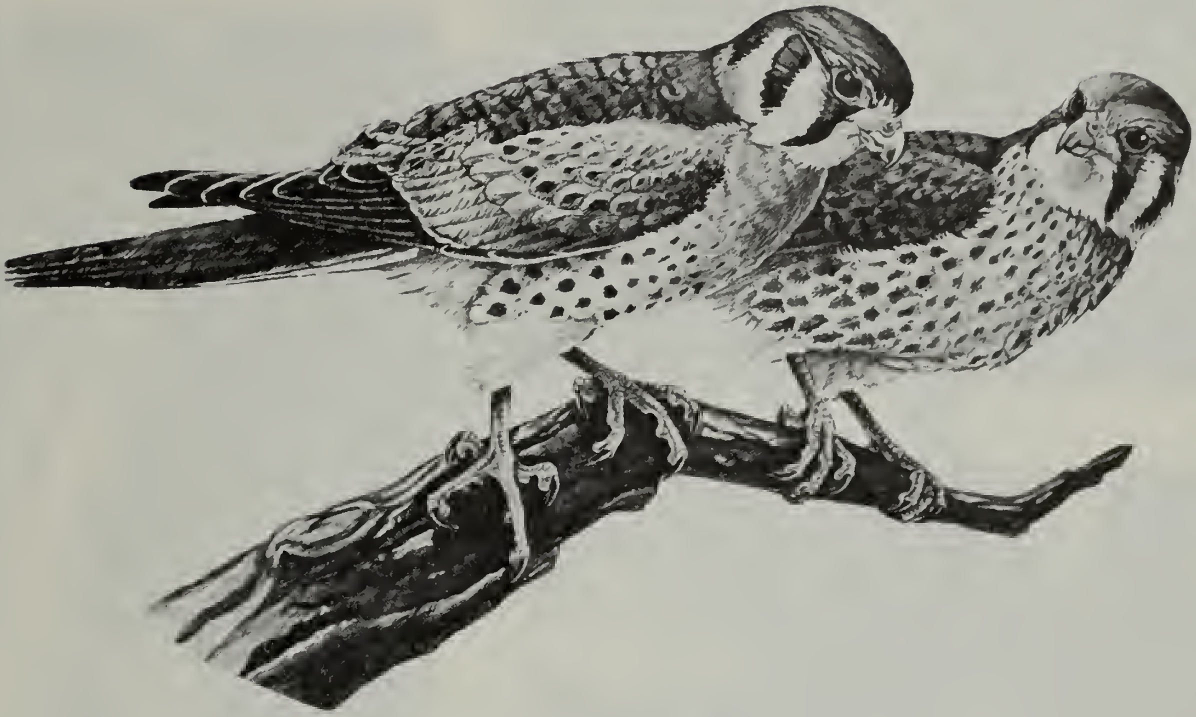


Fig. 39. Kestrel (Sparrow Hawk).

Nest and Habitat Characteristics

The Kestrel, or Sparrow Hawk, is one of the most abundant raptors in the West, commonly observed perched along roadways on power poles or telephone poles and the associated wires, or on fenceposts. They are relatively tolerant of the presence of man, frequently nesting in cavities of dead or living trees around farmyards. Abandoned Flicker holes or natural cavities created by rot or wind breakage are the most common nesting sites while cavities and holes in cliffs are commonly utilized in areas where trees are scarce. They are also known to have nested in holes in clay banks. They will readily utilize large-size bird boxes placed on dead or open trees or on telephone poles, etc.

Nest Survey Methods

Surveys for Kestrel nesting sites are conducted by systematically driving roads, searching clifflines, and examining areas containing scattered tree stands for the presence of the adult birds. Adults usually perch on conspicuous branches of dead snags or on powerlines where they are readily observed. Nests are usually within one-quarter to one-half mile of the observed birds.

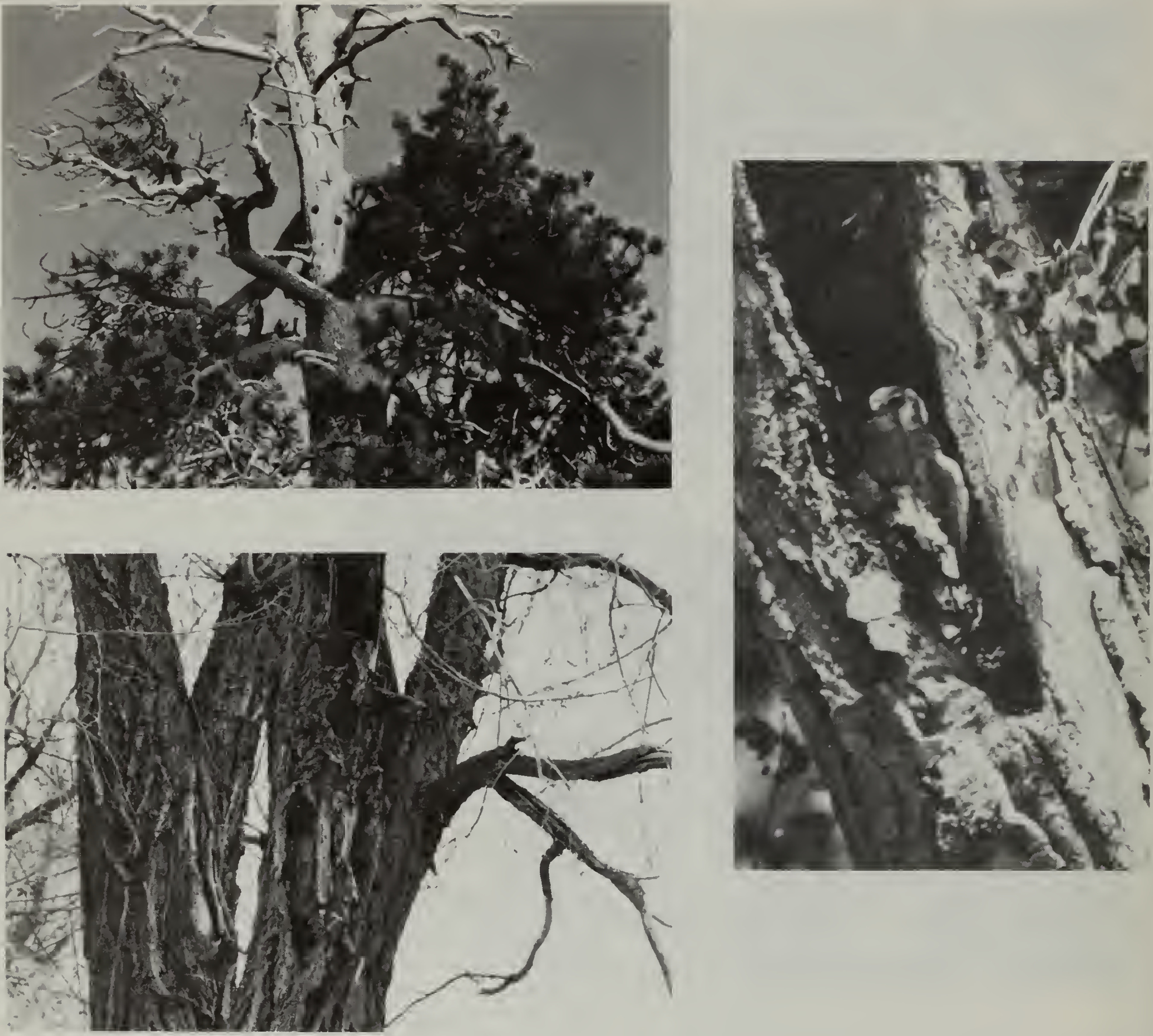


Fig. 40. Kestrels will nest in practically any type of tree cavity, as depicted above, and will also nest in cavities in cliffs or clay banks. They may also nest in abandoned buildings and will readily accept large-size bird boxes.

Goshawk
(Accipiter gentilis)

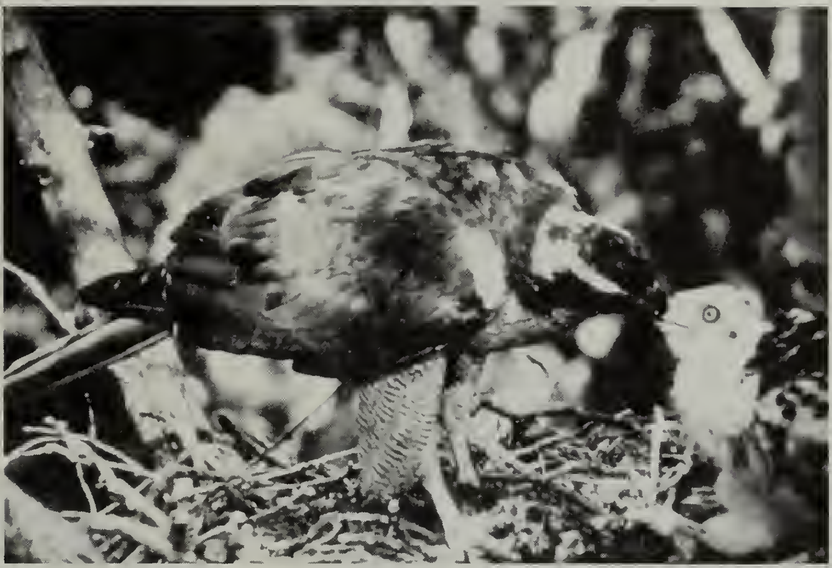


Fig. 41. Goshawk at nest with young.

Nest and Habitat Characteristics

Nesting sites of the Goshawk vary in different parts of the country. In the Northwest it commonly nests in mature Douglas-fir, ponderosa, or lodgepole pine of varying densities. Beneath the mature canopy there is often a secondary canopy created by young seedlings of somewhat non-uniform height and age distribution. The mature trees serve as nest and perch trees. Plucking posts are, for the most part, located in the denser portions of the secondary canopy. Nests are usually located in the lower portions of the mature canopy, against the trunk or out on a limb. The same nest may be used for several seasons. In the coniferous type the Goshawk may require 25 acres of undisturbed timber for nesting. Understory adjacent to the nesting site is usually light. The nest is usually about two feet in diameter and consists of small and medium sized twigs.

Goshawks will also nest in cottonwoods and other deciduous trees in stream bottoms, especially in canyons, and in deciduous forests of Alaska, Michigan, and other areas. In such areas the nests are usually located in excess of 30 feet above the ground and are more commonly placed near the trunk.

Nest Survey Methods

Aerial surveys are ineffective when searching for nests in coniferous forests or in deciduous forests when the leaves are on. Throughout much of the West, Goshawks nest in moderately dense stands of coniferous forest, but also nest in mixed conifer and deciduous tree stands along the borders of mountain valleys and along stream bottoms. Nests are found by systematically searching stream bottoms and wooded slopes and by constantly watching for the adult birds.

Comments

The adults are extremely vociferous and defensive of the nest site. The larger female as well as the smaller male show no hesitation in attacking intruders, cleverly dodging limbs and tree trunks with remarkably rapid flight. They will commonly strike intruders who attempt to climb to their nests, knocking off hats or sinking talons into shirt or back.

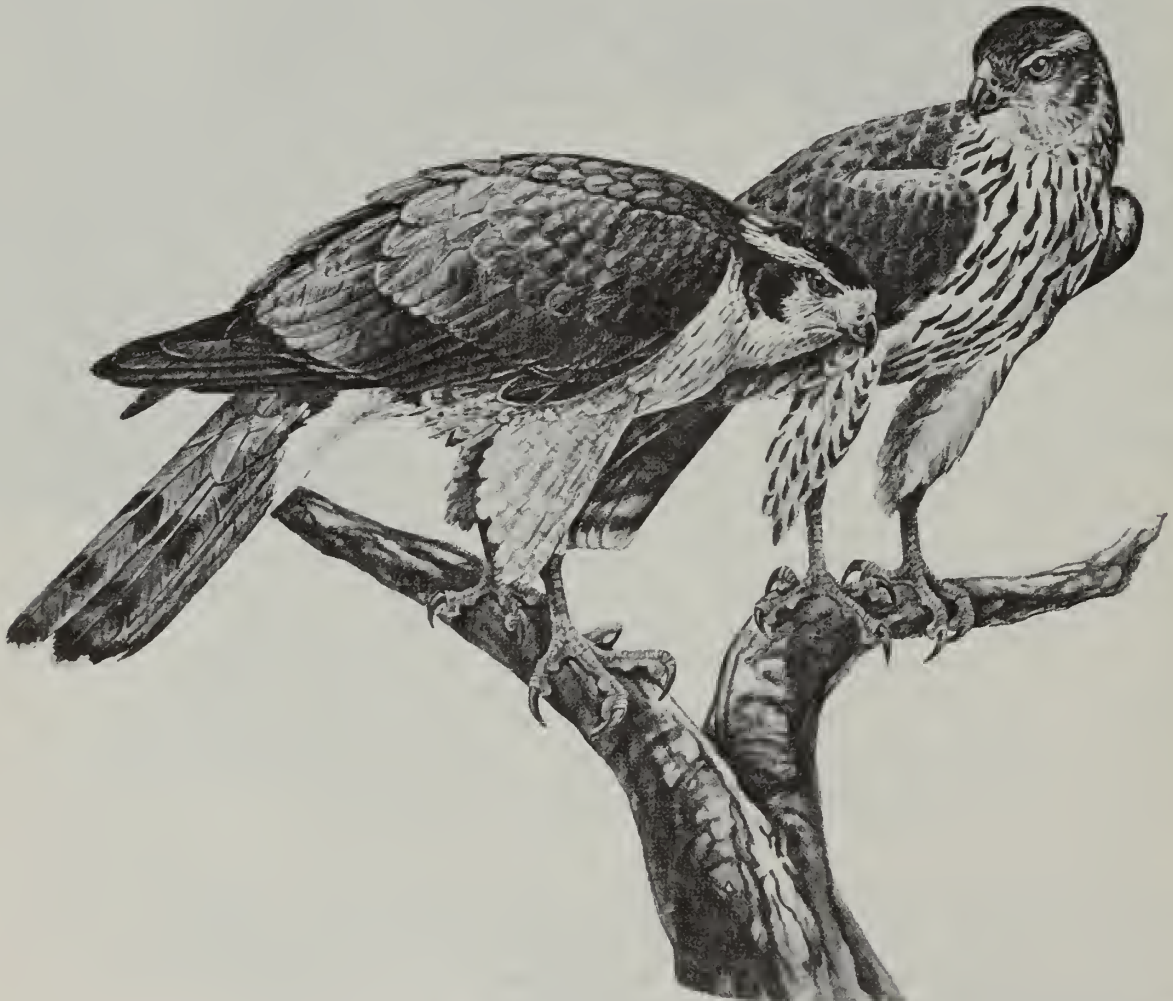
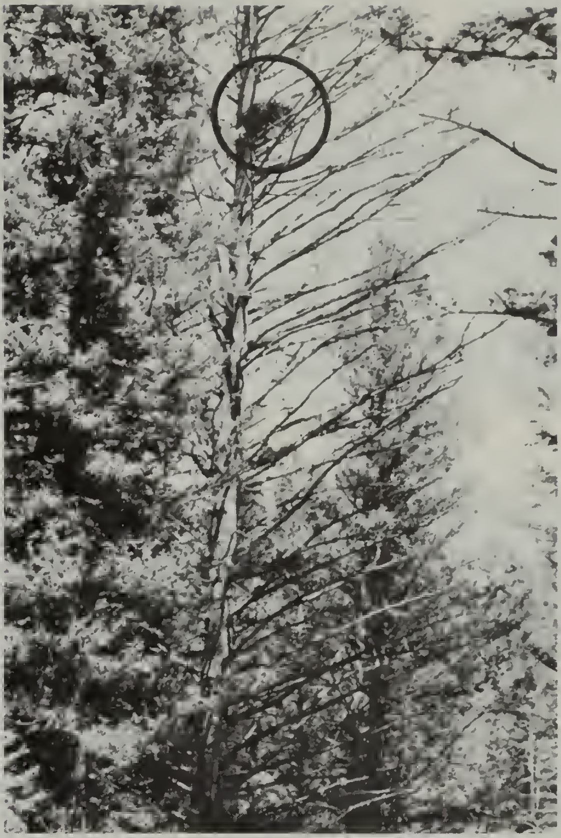


Fig. 42. Male (left) and female (right) Goshawks.

Fig. 43. The nest of the Goshawk is normally in excess of 30 feet above the ground and is usually built against the trunk of the tree. Cooper's Hawk nests are frequently built on branches away from the trunk.



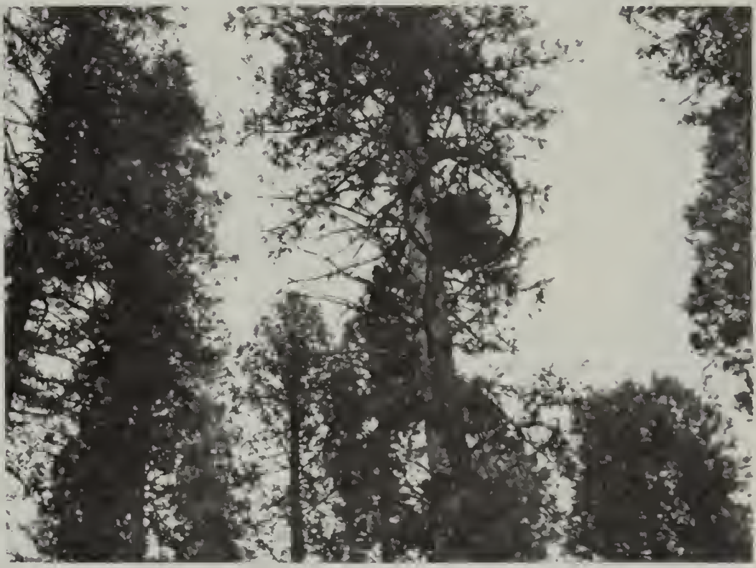


Fig. 44. A typical Goshawk nest built against the trunk of a Douglas fir tree in an area of relatively low tree density.

Cooper's Hawk
(Accipiter cooperi)

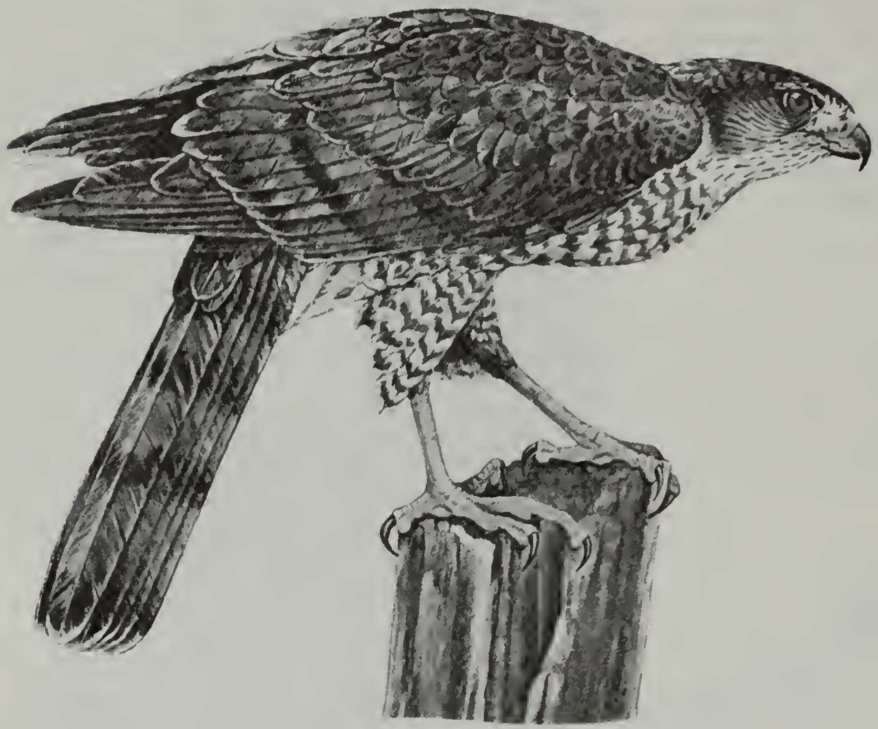


Fig. 45. Cooper's Hawk

Nest and Habitat Characteristics

In the Northwest the Cooper's Hawk commonly selects nest sites in dense, although somewhat older, second-growth Douglas-fir or lodgepole pine of uniform height and trunk diameter (12-18 inches, dbh). In the Douglas-fir regions, the nest grove consists of deciduous trees which are being shaded out by the dense canopy of the Douglas-fir. In areas of the Northwest where coniferous trees are not available, hardwoods may be selected. Cooper's Hawks may require a minimum of 15 acres of suitable, undisturbed timber for nesting and may use the same nest site for three or more years. The nest is usually located either beneath or just into the lower portion of the canopy, and may be either against the trunk or on forks of outer branches.

Throughout much of the West, Cooper's Hawks nest in stands of cottonwoods along stream courses, especially where the tree stands are fairly large. While Goshawks tend to nest more along valley foothills and into adjacent canyons, they may sometimes be found nesting along stream courses with Cooper's Hawks and their nests are quite similar. The nest is a substantial structure of sticks and twigs, lined with bark from pine or other trees or shrubs. Nests are not as frequently decorated with greenery as nests of buteos.

Fig. 46. Cooper's Hawk nest constructed against the trunk of an aspen. Nests are often built on outer branches.

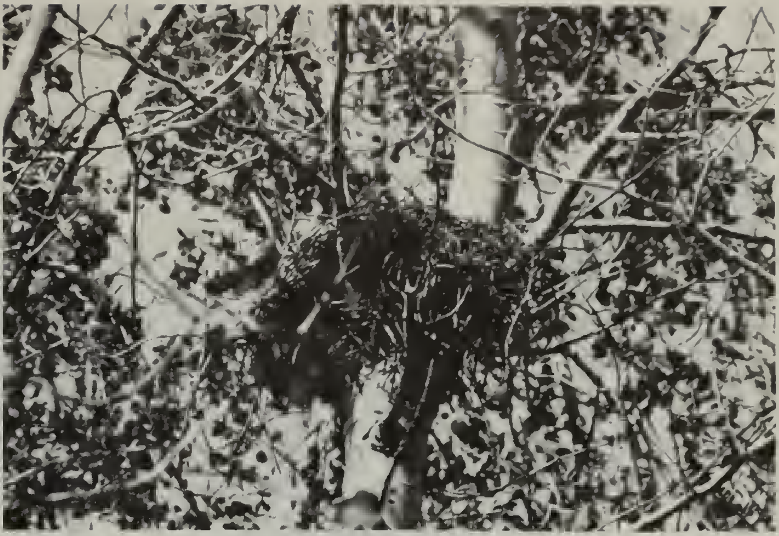


Fig. 47. Cooper's Hawk preparing to settle down on eggs.

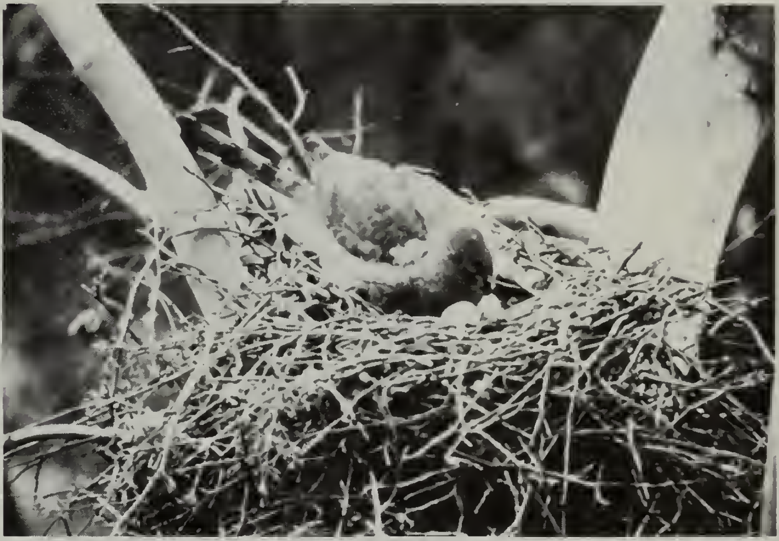
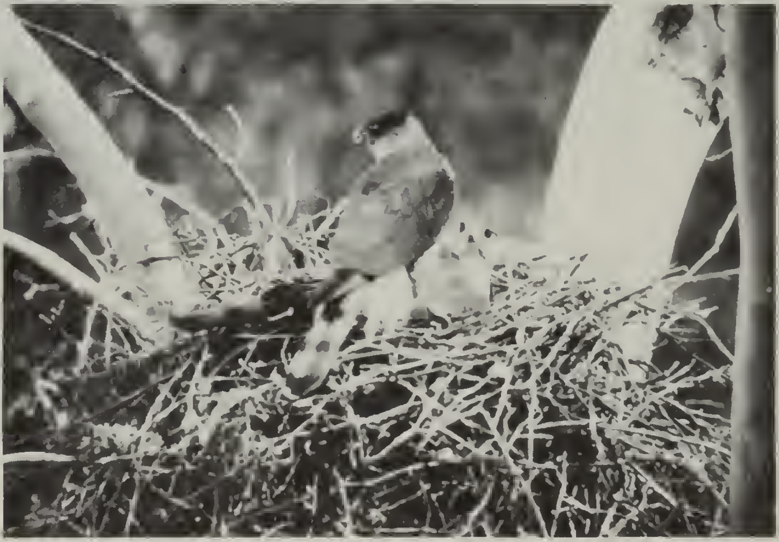


Fig. 48. Photo showing typical Cooper's Hawk nest structure.



Sharp-shinned Hawk
(Accipiter striatus)

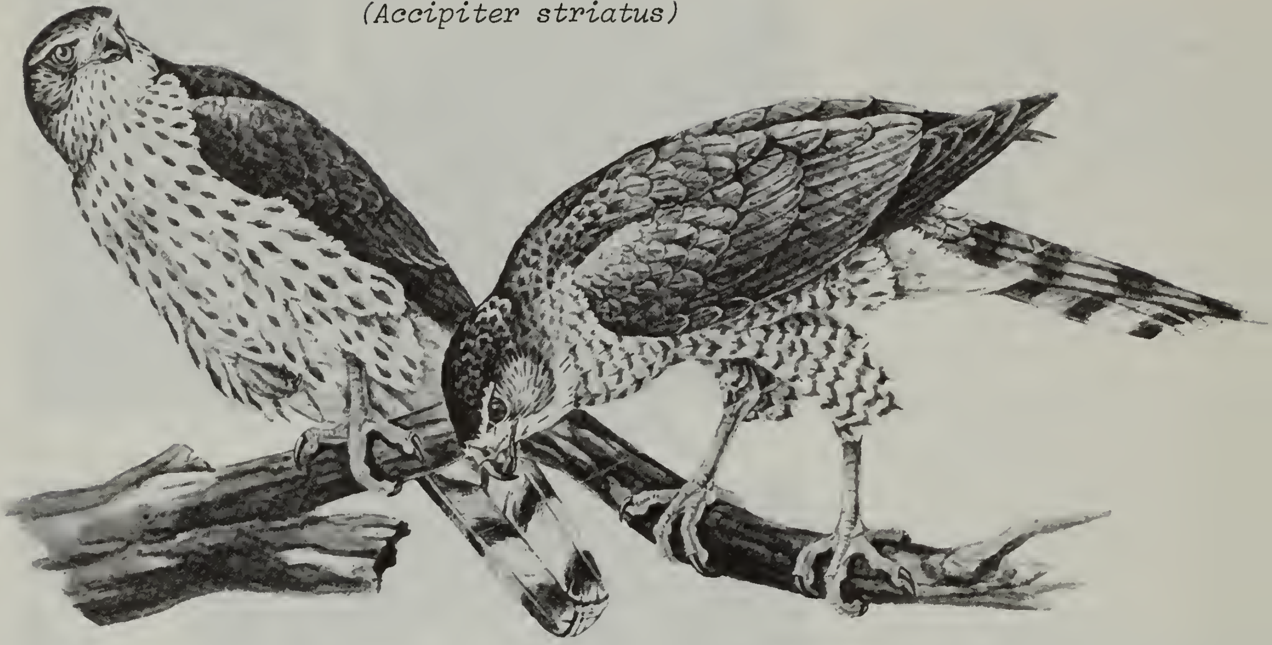


Fig. 49. Sharp-shinned Hawk

Nest and Habitat Characteristics

These hawks select nest sites which are composed of dense stands of second-growth Douglas-fir, lodgepole pine, or other conifers (usually with trunk diameter of 8-15 inches dbh). Where coniferous trees are not available, dense stands of hardwoods or mountain brush may be utilized for nesting. Oakbrush is commonly used in the Intermountain states. Sharp-shins may use the same nest site for two or more years and may require a minimum of 10 acres of undisturbed vegetation for successful nesting. The nest consists of a platform, about one to one and one-half feet in diameter, and is normally built on a limb against the tree trunk. It is constructed of small twigs and, generally, lined with pine needles, leaves, or other debris. Because it is frequently built in tall evergreens, it is hard to see and difficult to find.

Nest Survey Methods

Sharp-shins may be surveyed by searching stands of conifers, hardwoods, or mountain brush and watching for the adults. Since accipiters are relatively late nesters, surveys are best conducted during late June and until mid-July. Nests of all accipiters average considerably smaller than those of the buteos that may be found in the same areas, such as Red-tailed Hawks. Swainson's Hawk nests are more flimsy in structure and are usually found in the tree canopy or outer branches, while the accipiter nests are most commonly found nearer to the trunk and under the canopy. Accipiter nests usually consist of larger twigs than those of the Swainson's Hawk.

Comments

Cries of derision greet any intruder that approaches this bird's nesting tree, with the usual Accipiter-type defense exhibited if the intruder attempts to climb the tree containing the nest.

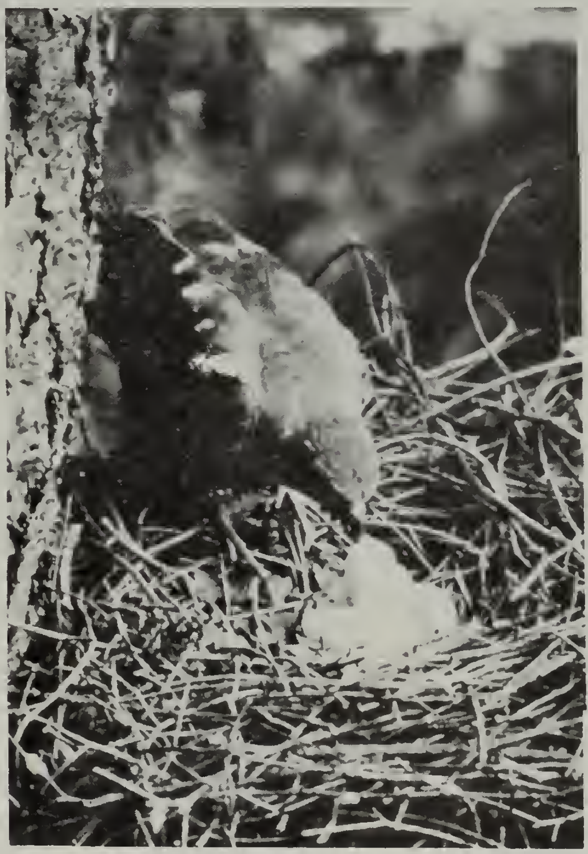


Fig. 50. Sharp-shinned Hawk with young at nest, showing common nest construction and location against trunk of a lodgepole pine.

Ferruginous Hawk
(Buteo regalis)

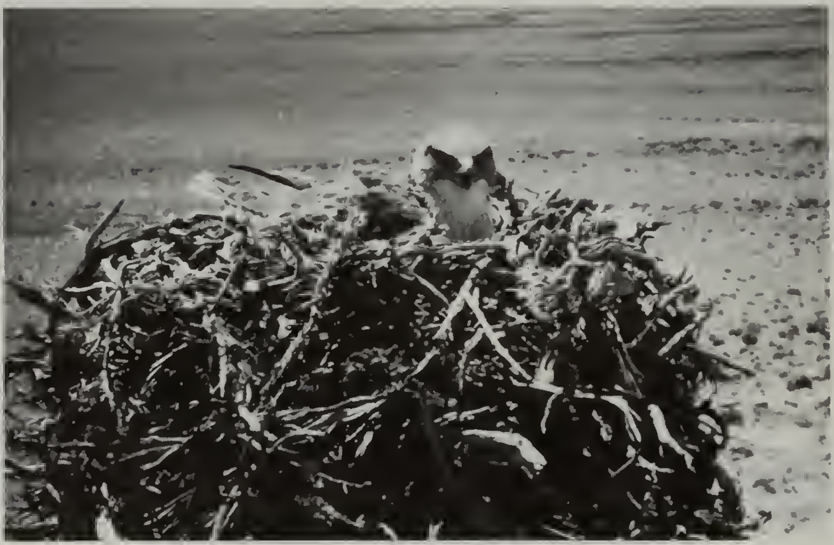


Fig.51. Ferruginous Hawk on nest in Central Wyoming.

Nest and Habitat Characteristics

The Ferruginous Hawk is restricted almost totally to the western plains. On the prairie it nests in trees along streams. In badlands or treeless areas, it nests on low cliffs, buttes, and cutbanks. It also nests on the edges of pinyon-juniper communities in either junipers or sagebrush. In some areas, ground nests are quite common. In trees, the nest may be located anywhere from about 6 to 40 feet in the tree. This hawk is undoubtedly the most adaptable in its choice of nesting sites of any of the raptors. It has been known to nest on chimneys, windmills, pumping structures, on straw stacks, power poles, abandoned buildings, on large sagebrush, sheepherder monuments, spoil piles from test pits, and in a wide variety of trees. It will nest on practically any type of large boulder or pinnacle on the desert or prairie and on a wide variety of low bluffs and rocky outcroppings. They are consistently absent from areas of steepsided canyons, cliffs, or heavily wooded areas, including the interior of pinyon-juniper woodland.

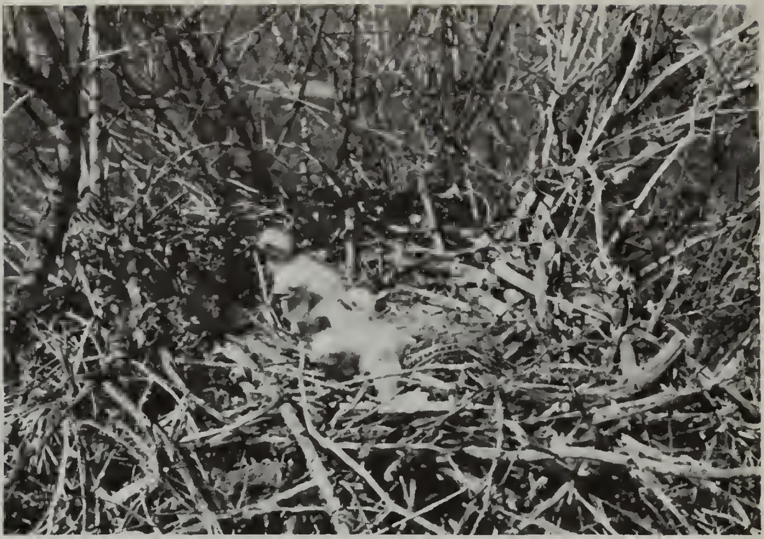
Nesting material is composed of sticks up to one inch in diameter which are taken from whatever is available in the area around the nesting site. In juniper nests, juniper, shadscale, and sagebrush provide most of the materials used in nest building. Dried cow manure is probably the most commonly found item composing ferruginous hawk nests. It's function is unknown, but is highly characteristic of this species' nest.

Nest Survey Methods

Nests of these hawks are relatively conspicuous, whether constructed on the ground, in trees, or other elevated locations. Nests are quite easily located by knowledgeable persons by driving available roads in an area and examining with binoculars any dark-looking structure in likely looking nest sites. Nests can almost always be located if the adult birds are observed circling in the sky, usually within one-half mile. The adults are moderately to highly defensive of their young, normally circling in the sky above the nest and giving their characteristic whistling cry until the intruder leaves. Dives at nest examiners are quite common but contact is seldom made. Surveys are best accomplished during mid to late June when the young birds are conspicuous in the nest in either white or dark plumage. During the two weeks prior to fledging, the young will commonly stand on the edge of the nest to permit better cooling by desert breezes, and are very conspicuous at this time.

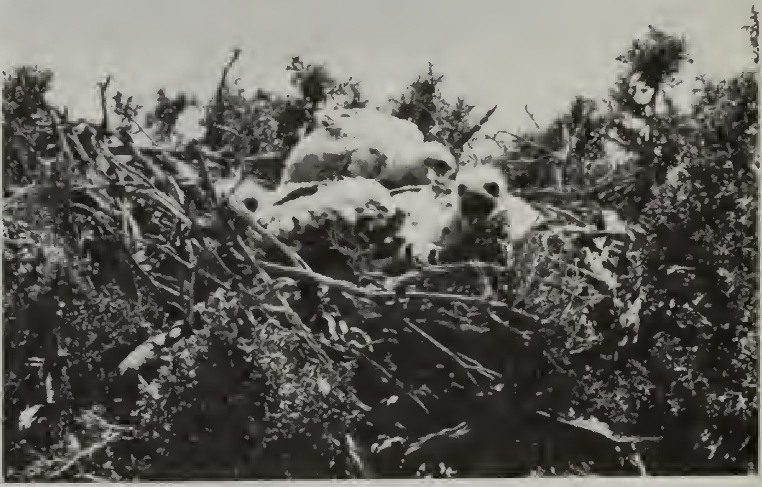
Fig. 52. Ferruginous Hawk on perch.

Fig. 53. The Ferruginous Hawk nests in a wider variety of nesting sites than any other Buteo. In some areas it commonly nests in isolated trees, such as this Chinese Elm at an abandoned homestead,



OR

Fig. 54. . . . in the tops of junipers or pinyon pines, near the stand peripheries,



OR

Fig. 55. . . . even in the tops of big sagebrush plants.

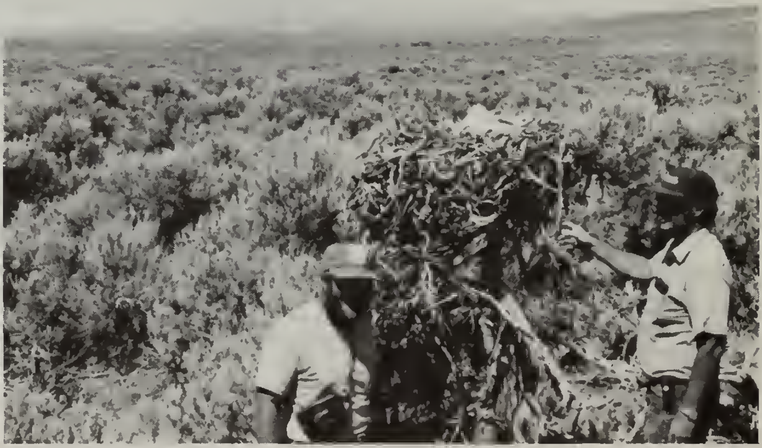


Fig. 56. The Ferruginous Hawk almost never nests on the sides of high cliffs, but commonly uses ledges or projecting points on low, rocky outcroppings, such as the one shown here.

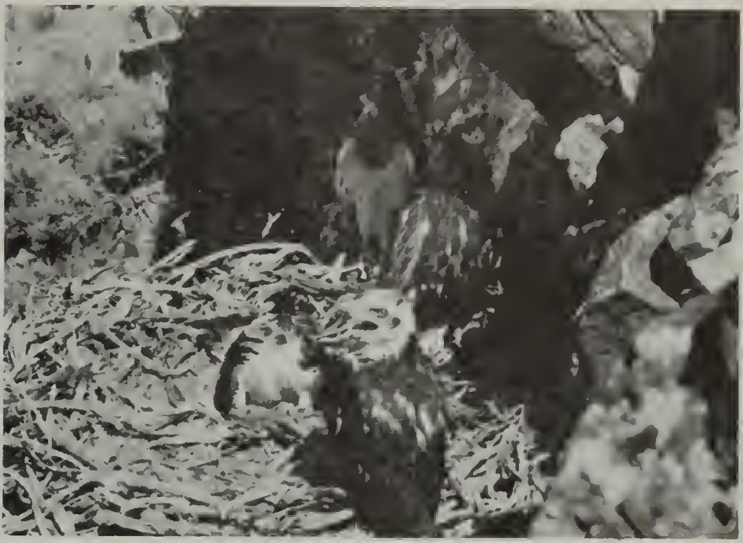


Fig. 57. This hawk will nest on any type of rocky pinnacle on the desert or prairie.

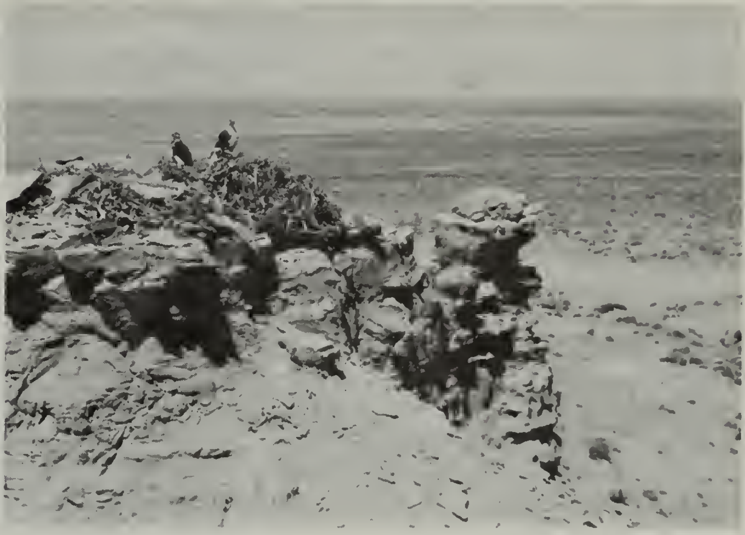


Fig. 58. Where large boulders are not present, it will nest on the sides or ends of desert ridges, or even on the sides (banks) of eroded washes.

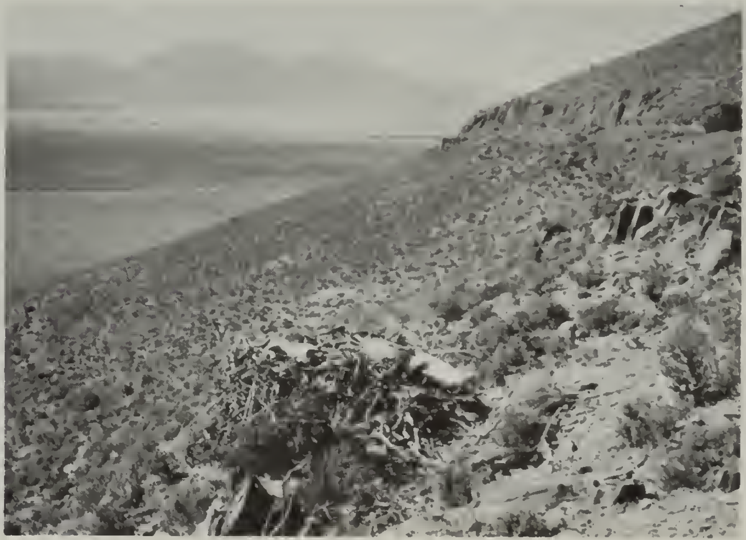


Fig. 59. This hillside nest of the Ferruginous Hawk was constructed on a small pile of rocks.

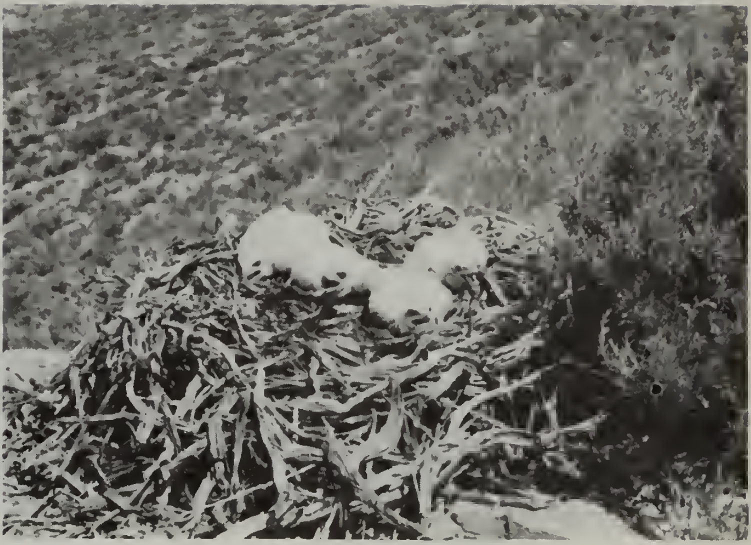


Fig. 60. In Wyoming and other states these hawks commonly nest directly on the ground, with surprisingly little mortality from predators. This nest was constructed predominantly with dried horse manure.

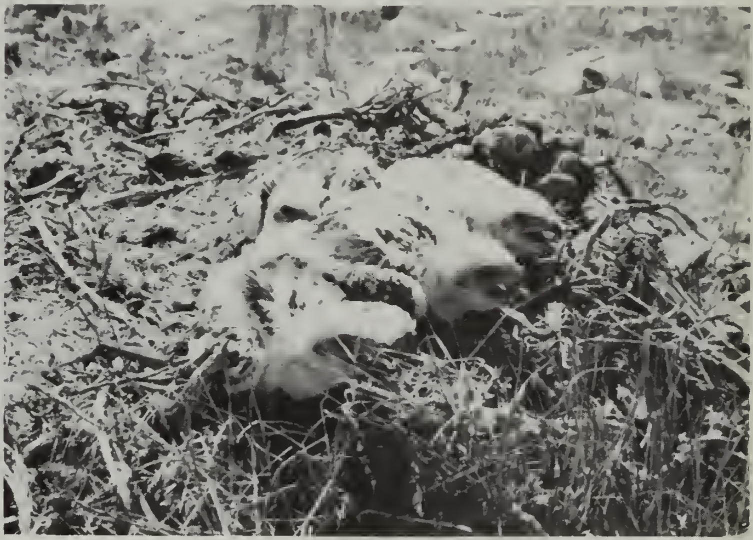


Fig. 61. Even uranium spoil piles are utilized as nesting sites in central Wyoming.

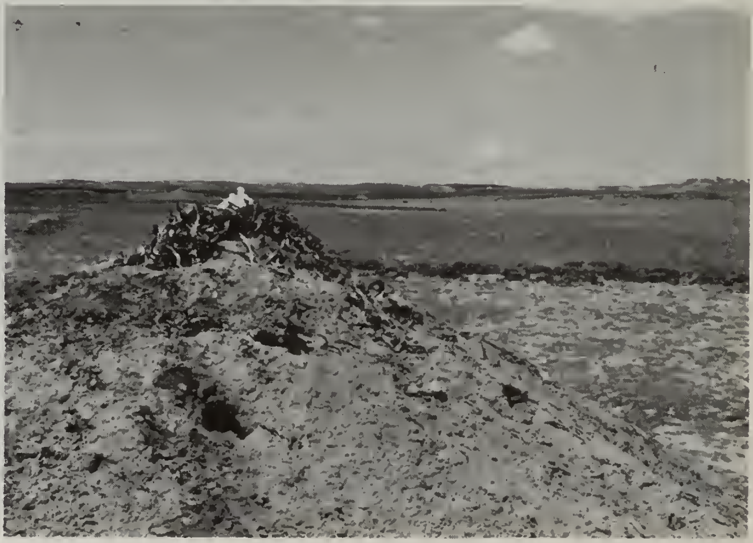


Fig. 62. Any elevated structure, natural or man-made, may be utilized by the Ferruginous Hawk for a nest platform. A pair has successfully used this sheepherder monument for two years.

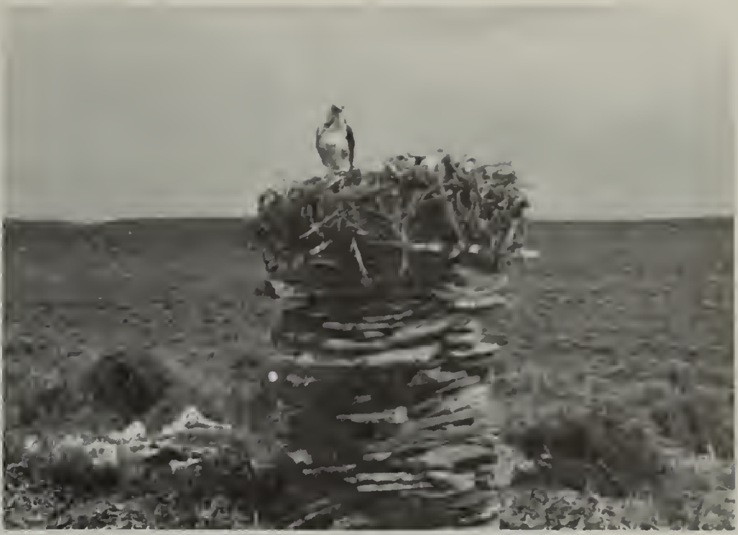


Fig. 63. The chimney of an abandoned rock house was used as a nest site in northeastern Colorado.

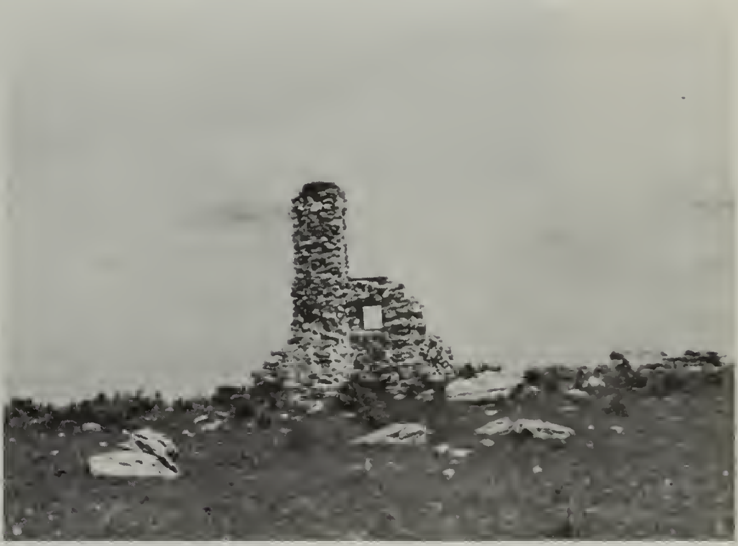
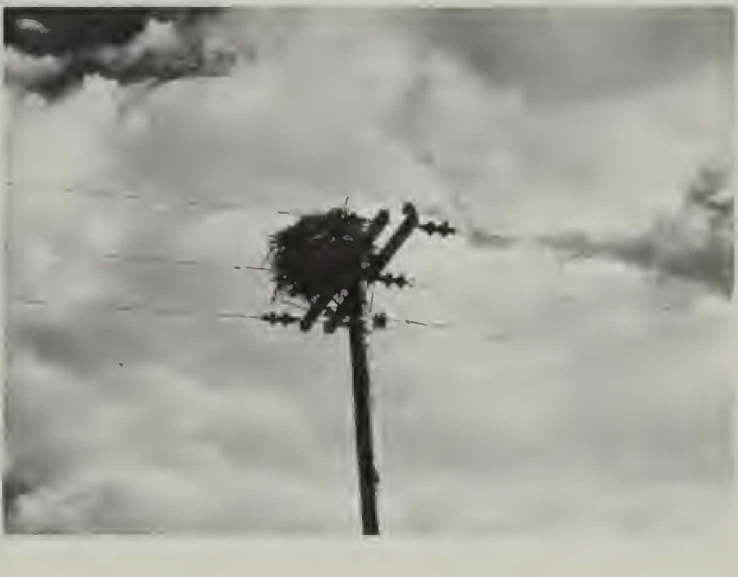


Fig. 64. The use of power-line poles and transmission towers as nesting sites is fairly common.



Red-tailed Hawk
(Buteo jamaicensis)

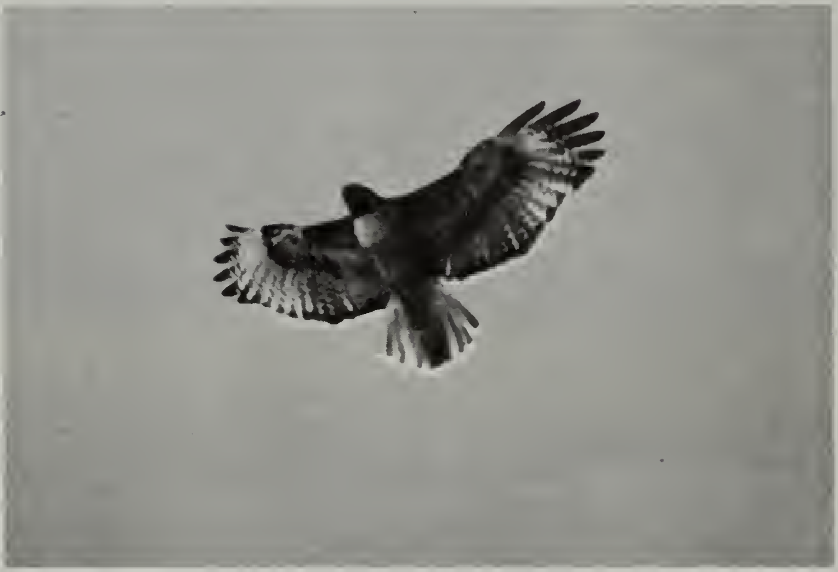


Fig. 65. Red-tailed Hawk.

Nest and Habitat Characteristics

These birds commonly nest on sheer cliff faces, unlike Ferruginous Hawks, and in a variety of trees, usually more than 25 feet from the ground. Nests may be found on low "walk-in" ledges or high up on sheer cliffs. They commonly nest in agricultural areas in scattered trees found there and are tolerant of human activities up to 75 yards from the nest. The nest size and material used is similar to that used by Ferruginous Hawks and the two may be confused when the nest is located in large trees on the prairies. In trees, the nest is usually located near the canopy but may be placed near the trunk or on outer branches.

Nest Survey Methods

Surveys for red-tails are best accomplished by driving available roads and examining all nest-like structures observed in trees or by examining cliff lines with binoculars for the presence of stick nests. Isolated trees or small clumps are likely nest locations.

Comments

Red-tailed Hawks are very active in the defense of their young, often making numerous "stoops" at any intruders that approach the nest site. Both birds usually remain at the nest site when an intruder is near, periodically making dives, or otherwise circling overhead with watchful eyes.

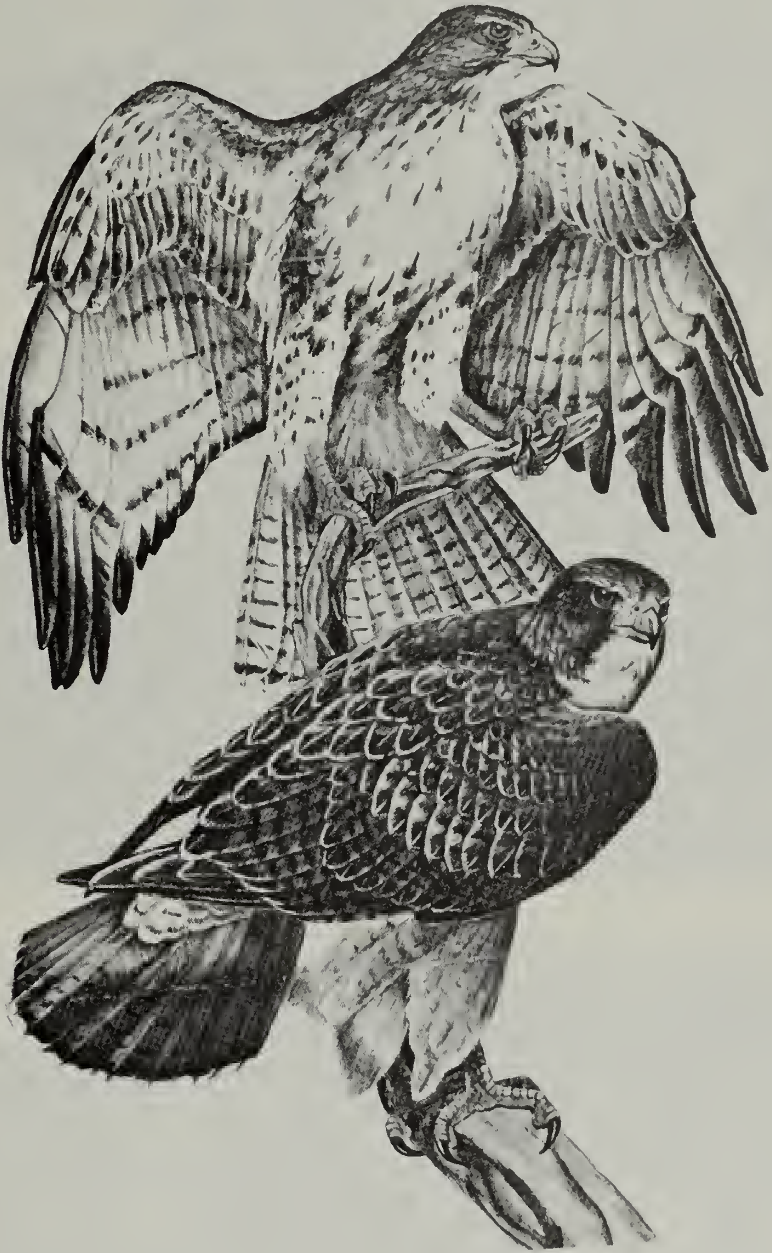


Fig. 65A. Mature Red-tail (below) and immature Red-tail (above).

Fig. 66. Red-tailed Hawks are very vociferous when intruders are near the nest. While they normally do not dive at intruders as actively as Ferruginous Hawks, they will usually circle close overhead, hurling insults at the offending humans.

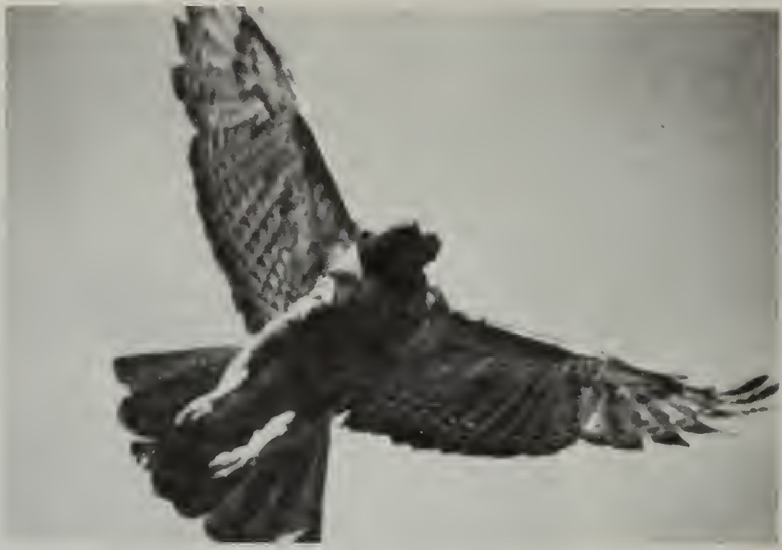


Fig. 67. Red-tails will nest in a wide variety of trees, usually near the tops. They sometimes alternate use of nests with Swainson's Hawks and Ferruginous Hawks. Their nests are common nesting sites for Great Horned Owls.

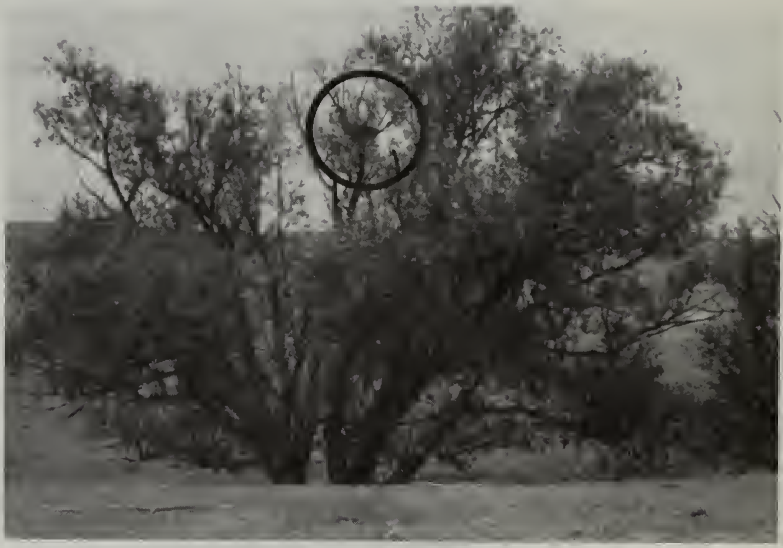


Fig. 68. Around the foothills or within the interior of desert mountain ranges, the Red-tail often uses juniper trees for nest sites. Such sites are also commonly used by Ferruginous Hawks.

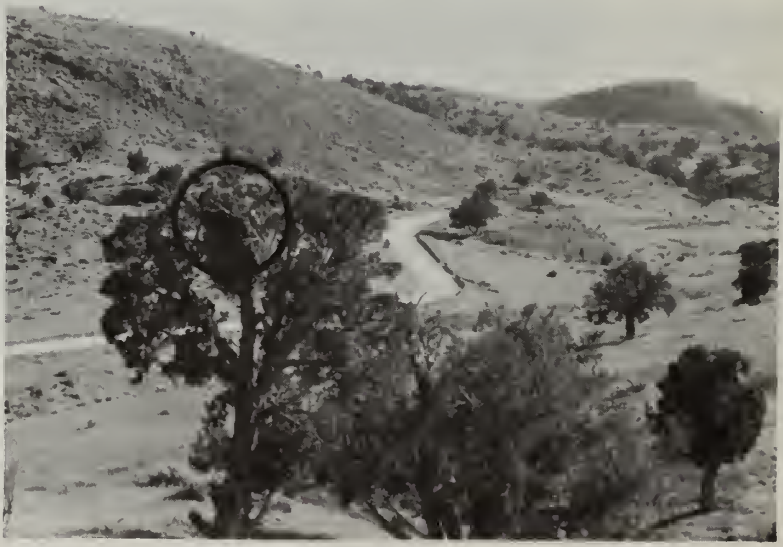


Fig. 69. For any species of raptor, the nesting stages may vary considerably within a local area. These young Red-tailed Hawks in western Wyoming were only about one week old on June 25, while . . .

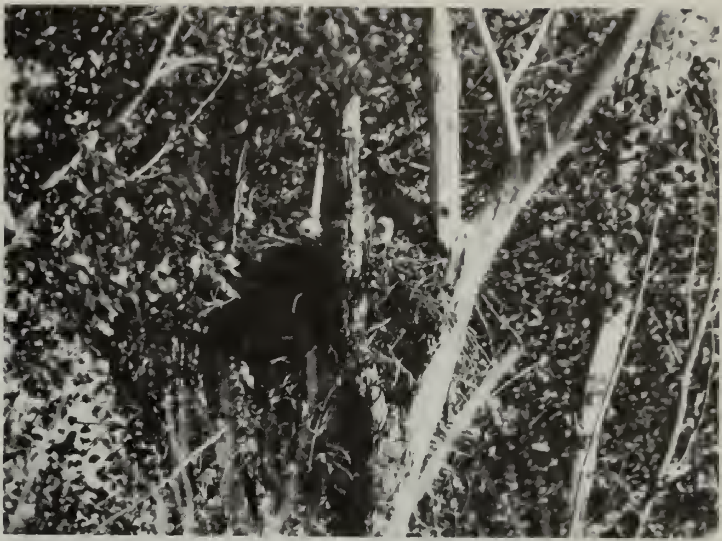


Fig. 70. . . . a nest only one mile away contained young birds almost ready to fledge on the same date.

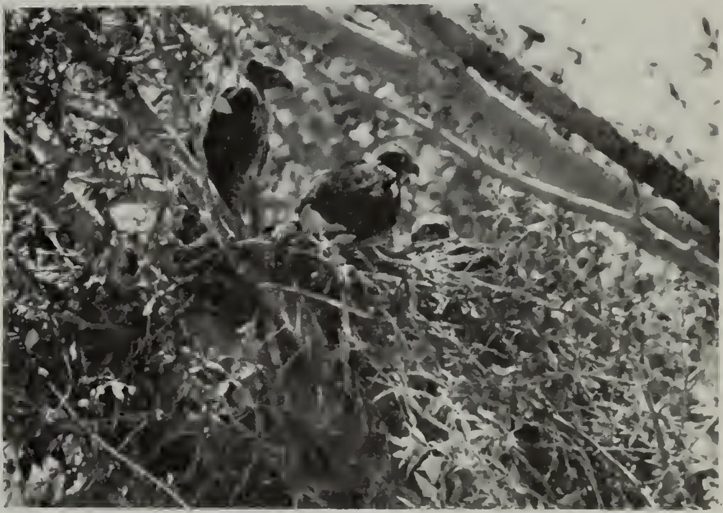
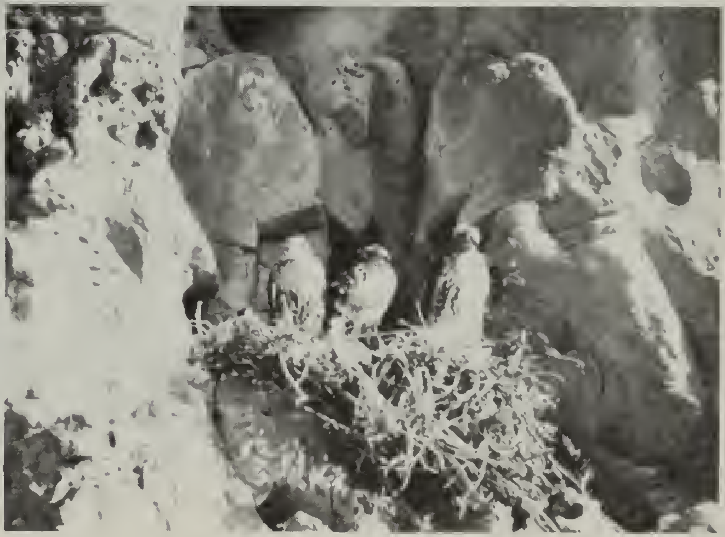


Fig. 71. Red-tailed Hawks nest on cliff ledges with about the same frequency as they nest in trees. Unlike Ferruginous Hawks, they commonly nest on high, steep cliff faces.



Swainson's Hawk
(Buteo swainsoni)

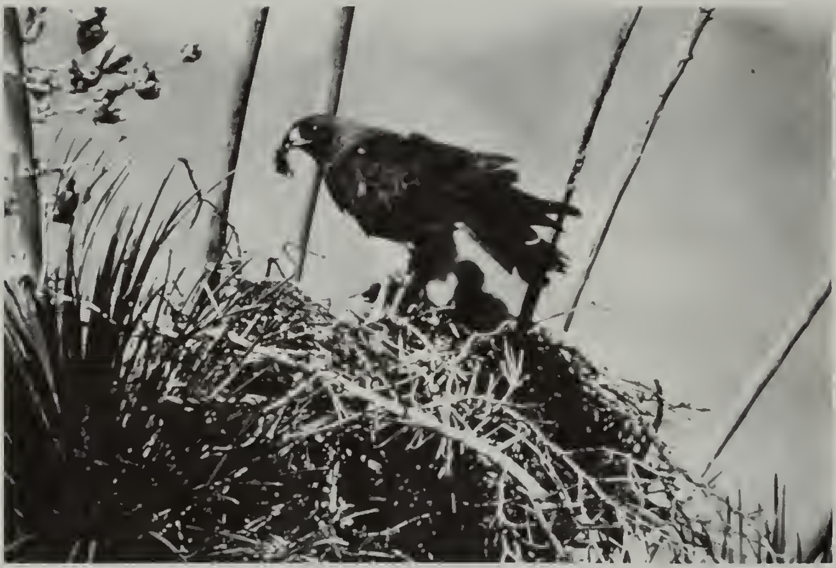


Fig. 72. Swainson's Hawk at nest in tall yucca plant in Arizona.

Nest and Habitat Characteristics

This hawk nests most often in trees or tall bushes and almost always in the upper one-third of the tree. The nest is a relatively flimsy structure when compared to Red-tailed and Ferruginous Hawk nests. It sometimes appears more like a mashed-down tumbleweed than a nest and is usually composed of weed stems and small woody branches. It often blows out of trees in strong winds. It may be somewhat inconspicuous when built in the canopy of trees because of its relatively small size. When the birds are incubating, they are often difficult to flush and an observer may pass by the nest tree without being aware of the nest. These birds are quite trusting of humans and often construct their nests in close proximity of farm houses and other human activities. In western deserts the birds often construct nests in junipers or in isolated cottonwoods along dry stream bottoms and in the Southwest also commonly nest in mesquite and saguaro cacti. The author knows of only one nest that was constructed on the ground. This one was on a steep, rocky hillside and was the replacement for a tree nest when the tree blew down. An occasional pair of Swainson's Hawks will nest on transmission line poles.

Nest Survey Methods

Swainson's Hawks are common in agricultural areas and valleys throughout the West, and they nest primarily in the foothills and valleys. Nests are found primarily by driving available roads in desert or agricultural valleys and searching treetops for nests with the use of binoculars. The birds construct new nests almost every year, making them more obvious because of the fresh materials used. The birds will sometimes use old Red-tail, Raven, or Eagle nests, so these nests should all be scrutinized during any survey for raptors. The birds circle the nest site, uttering a plaintive, clear cry when humans are near.

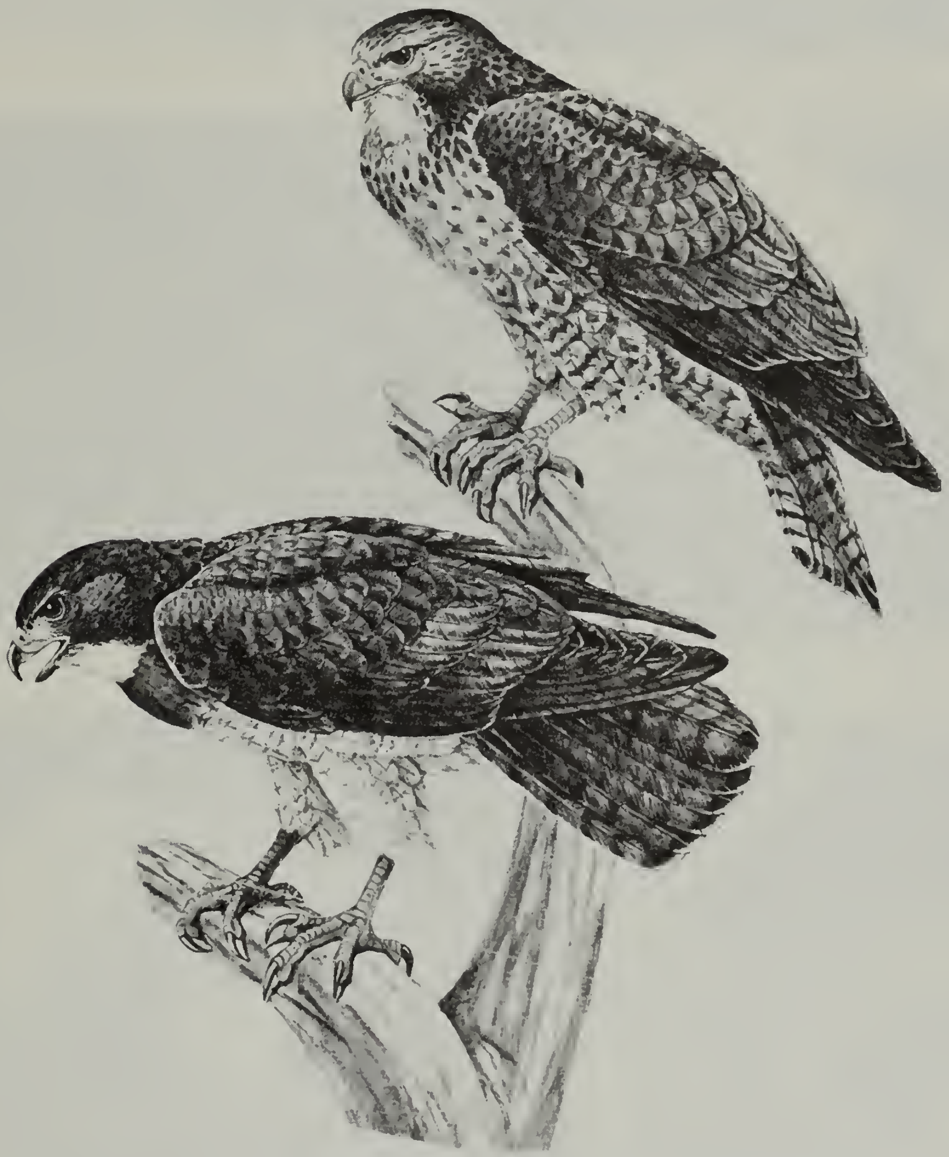


Fig. 73. Adult and Immature Swainson's Hawks.

Fig. 74. The Swainson's Hawk Nest is usually a flimsy structure and, consequently, it is often blown down by high winds.

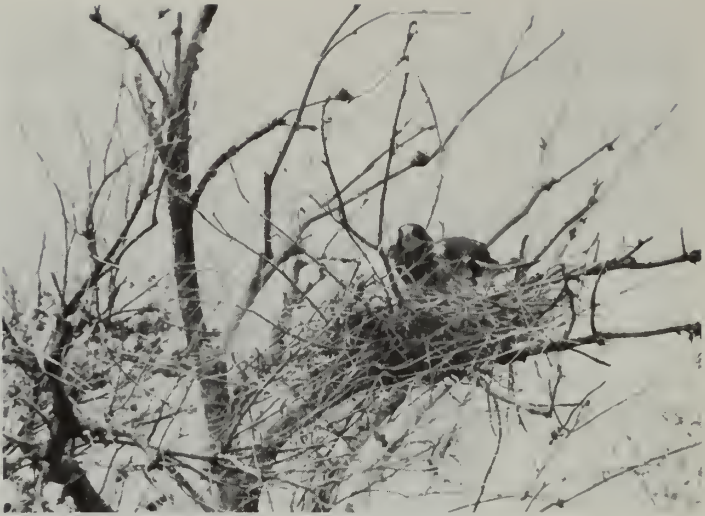


Fig. 75. The normal clutch size for Swainson's Hawks is two or three eggs.

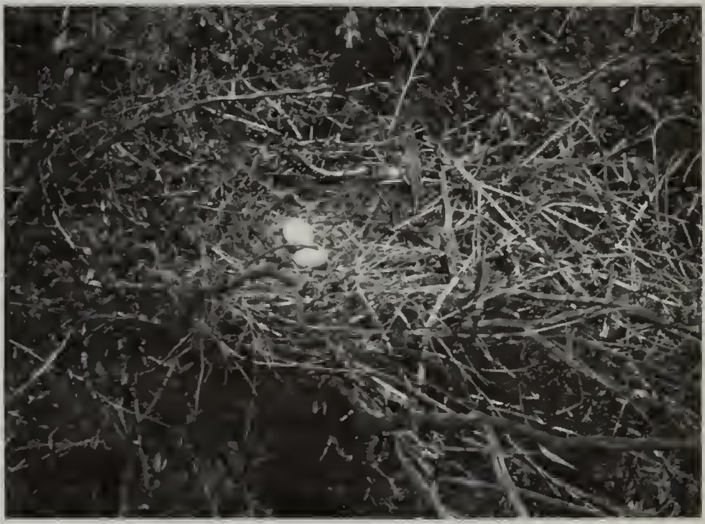


Fig. 76. These young birds are about a week old. Note the relatively small weeds and other materials used for the nests in this photo and the one in Fig.75. Ferruginous Hawk and Red-tailed Hawk nesting materials are much more coarse. (See Figs. 59 and 71.)

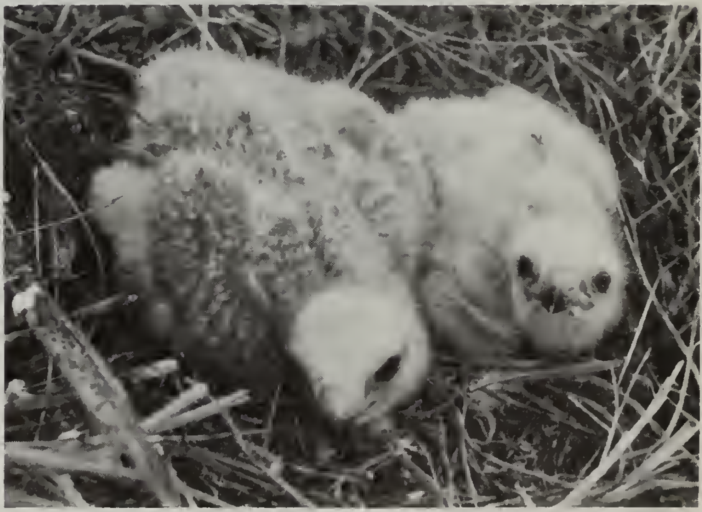


Fig. 77. Swainson's Hawks nest in trees about 99 percent of the time, usually high in the canopy or in the outer edges. This nest is constructed mostly of small cottonwood branches and leaves.

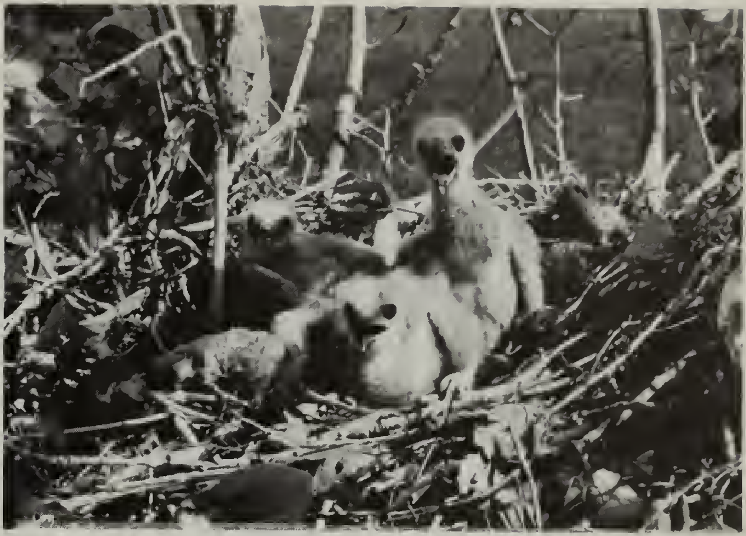


Fig. 78. The young of all raptors have distinguishable plumage patterns that can be learned with a little experience. The Swainson's hawk is the most docile of the Buteos, sometimes nesting in trees within a short distance of occupied farm buildings.

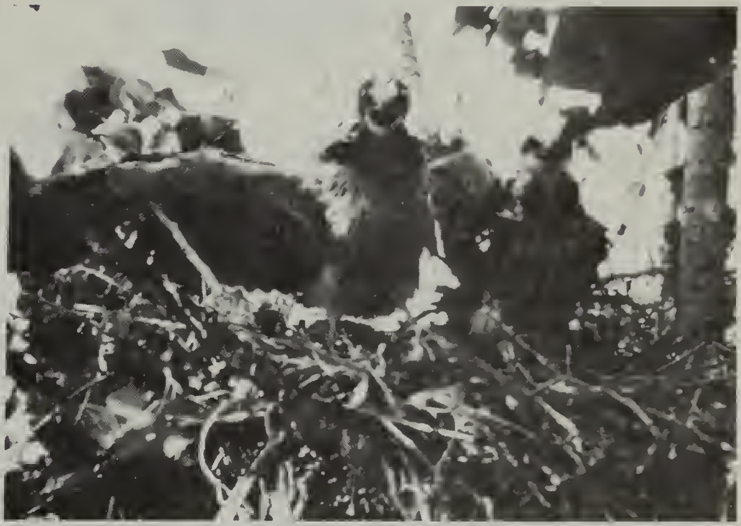
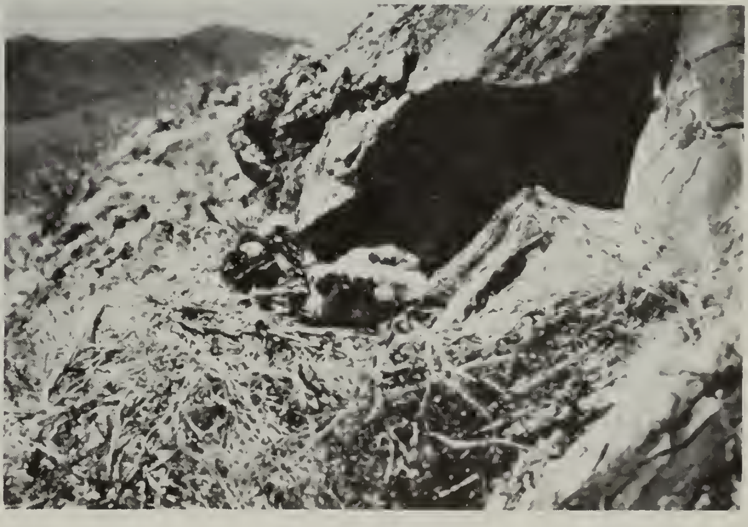


Fig. 79. This is the only nest the author knows of that was constructed on the ground. It was constructed at the base of a rocky ledge on a steep hillside in western Utah.



Rough-legged Hawk
(Buteo lagopus)

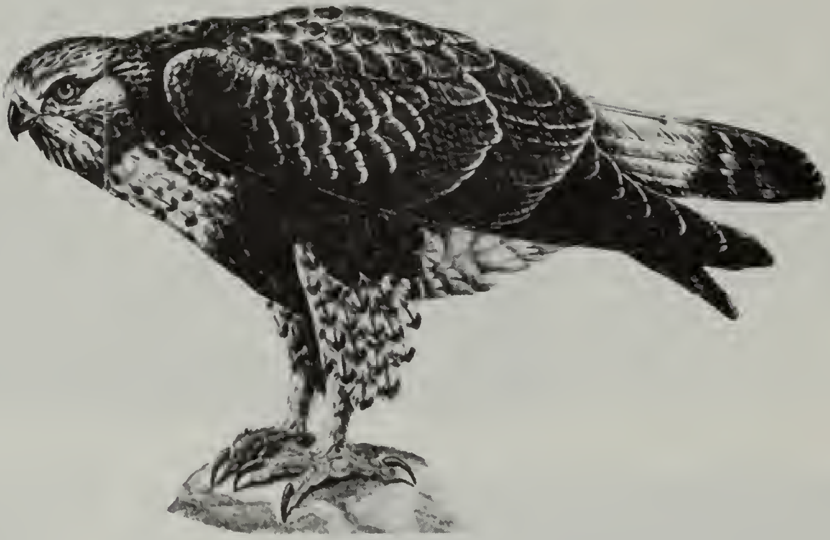


Fig. 80. American Rough-legged Hawk.

Nest and Habitat Characteristics

The Rough-legged Hawk is the most common hawk of the American artic. While thousands of these birds annually migrate southward into the United States to spend the winter and early spring, they nest only in Canada and Alaska. In the far north the Rough-leg is essentially a cliff-nester, utilizing rocky outcroppings and ledges, often in locations which appear easily accessible to terrestrial predators. River bluffs, isolated upland outcrops, and continuous escarpments in the lower elevations of the Brooks Range form a conspicuous part of the topography in Alaska and also account for much of the cliff-nesting habitat. Of these three categories of cliffs, Rough-legs use the river bluffs most extensively, and the occurrence of bluffs strongly controls the species' breeding distribution. In southern portions of its breeding range, Rough-legs construct many nests in trees because of a shortage of other suitable nesting sites.

Rough-legs have strong affinities for nesting sites, often returning to the same nest year after year, and occasionally nesting very close to its own or to other raptor species. Territorial behavior in these instances is usually not too pronounced. Grasses and sticks of various sizes, piled together crosswise, form the nest. The amount of nesting material varies with location of the nest; a nest built on a flat rock may contain just enough material to keep the eggs from rolling out, while a nest located on a slope may contain much more material near the front in order to make the platform level. While nesting, adults display great excitement and concern, diving and screaming at the intruder, usually from a distance. (15).

Nest Survey Methods

Surveying for Rough-legs normally takes place in conjunction with surveys for other artic raptors, such as Peregrines and Gyrfalcons. Essentially the same types of nesting habitat are utilized by all three species, i.e., river banks, escarpments, bluffs, or rocky projections. Surveys for nest occurrence and activity would best be conducted during mid June when young should be in the nest and the adults' defensive actions would make them more conspicuous. In these remote areas, helicopter, boats, and Super-Cubs are the most practical means for making surveys. All potential and known nesting sites should be examined by making several passes with aircraft or with the use of binoculars and spotting scope when on foot or in boats.

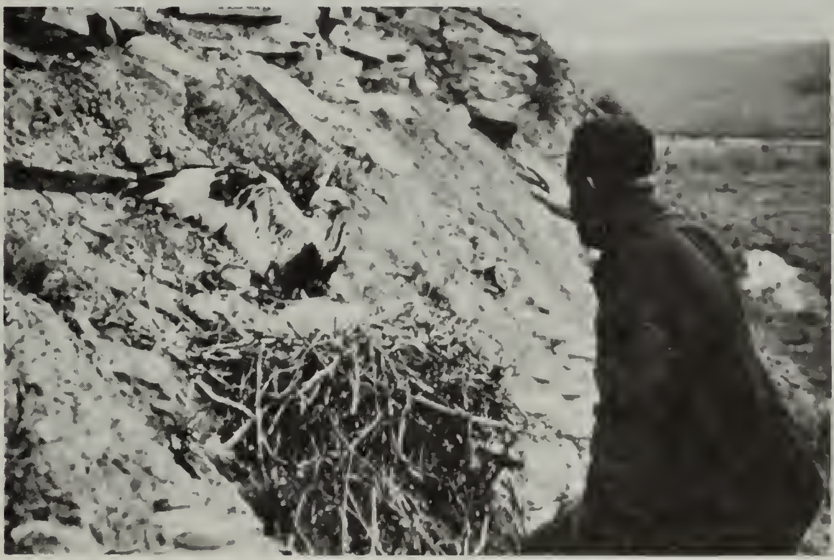


Fig. 81. Rough-legged Hawks nest primarily on the steep, sloping banks of rivers in Canada and Alaska, as well as on hillsides and rocky outcroppings. They are defensive of their nests and often permit close approaches without flushing.

Red-shouldered Hawk
(Buteo lineatus)

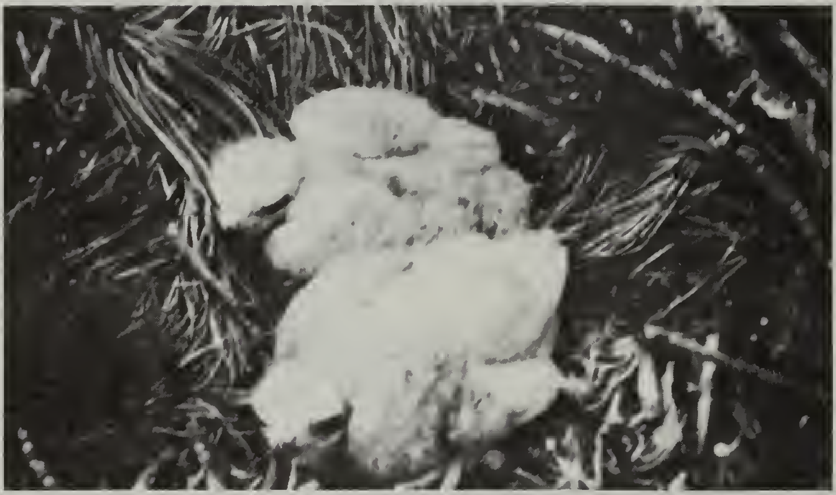


Fig. 82. Red-shouldered Hawk nest in conifer.

Nest and Habitat Characteristics

The Red-shouldered Hawk in the West is found primarily in California and seems to prefer to nest in tall trees, frequently along river bottoms. The nest structure is very similar to those of Red-tailed Hawks but is generally somewhat smaller. There does not seem to be any special preference for the type of tree in which to build the nest, but the nest is usually quite close to the trunk. The nest is well built of sticks and twigs of medium size and lined with strips of inner bark, fine twigs, dry leaves, sprigs of evergreen, and feathers or down. The clutch usually consists of three eggs, with occasionally two or four. These birds are very consistent in returning to the same territory or nesting site each year.

Nest Survey Methods

Nests are surveyed about the same way as for Red-tailed Hawks, i.e. by driving available roads and searching trees in fields and along streams for fairly large nests, especially near the trunks. Red-tail nests, however, are just as apt to be on outer branches. Watch for the adult birds. When located, try to stay within one-quarter mile of the bird and observe it with binoculars. With luck, you will be watching when the bird returns to its nest tree.

Black Hawk
(*Buteogallus anthracinus*)

Fig. 83. Adult Black Hawk at nest with young.

Nest and Habitat Characteristics

The primary areas utilized by Black Hawks in the United States are the drainages flowing from the Mogollon Rim into the Verde River, Salt River, and Gila River. The Gila River, Eagle River, and Arivaipa River are all important nesting habitats. Small nesting populations may be found in Texas, New Mexico, and Arizona, predominantly in the southern half of each state. Most Black Hawks nest along permanent streams, generally between 3,000 and 5,000 feet in elevation.

The Black Hawk nests primarily along streams or rivers where it feeds on many forms of aquatic prey, including frogs, fish, snakes, etc. Riparian habitats containing cottonwoods, sycamores, or other tall trees are extremely crucial to the survival of this species, since they are almost completely dependent on riparian zones and the associated prey during their reproductive period. Nests have been found in cottonwoods, sycamores, ash, alder, and ponderosa pines. Unverified reports indicate that Black Hawks may nest on cliffs, but the birds may have been confused with the very similar Zone-tailed Hawk which occasionally uses cliffs for nesting sites.

Zone-tailed Hawk
(Buteo albonotatus)

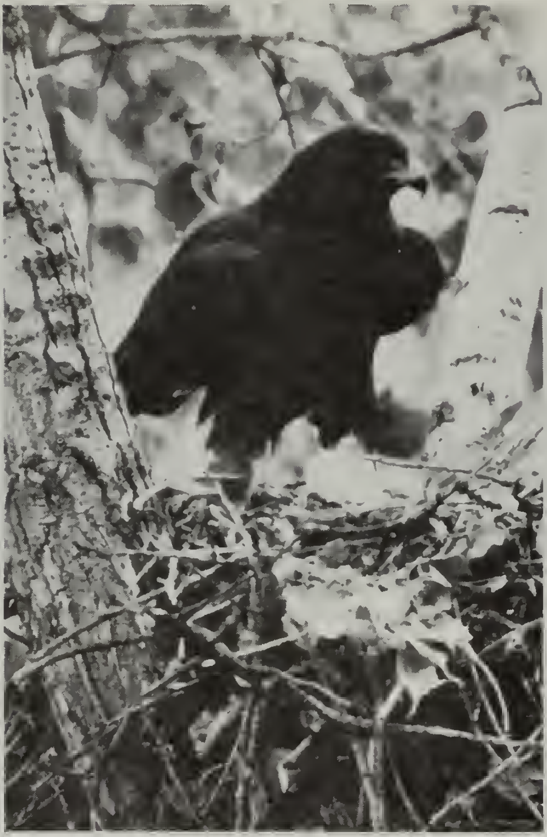


Fig. 84. Zone-tailed Hawk at nest.

Nest and Habitat Characteristics

The Zone-tailed Hawk is another Central American species that reaches the northern limit of its range in our Southwestern States. It nests in Texas, New Mexico, and Arizona, mostly in the southern parts. Like the Black Hawk, it is largely tied to riparian zones during its reproductive period. It seems to prefer broad, deep, rocky canyons which contain streams flowing over stony beds. But it may be found nesting in canyons containing dry streams. It nests primarily in the cottonwoods and sycamore trees in the stream bottoms, or within the flood plain. The nest may be anywhere from about 40 to 100 feet up, depending on tree height. It is usually constructed high in the canopy in one of the main forks of the tree. Nesting material consists mostly of cottonwood twigs of medium size and the nest is often lined with green leaves. The nests may become quite bulky after several years use. The normal clutch is two eggs, but there may be one or three. The adults become very concerned when humans approach the nest and usually circle overhead, uttering a constant, loud, querulous cry.

Nests are usually placed on a broad-forking crotch near the trunk of the tree and generally about 40 to 50 feet above the ground. The nests are a little smaller than nests of Red-tailed Hawks and are usually within the upper one-fourth of the tree. Nests consist mostly of cottonwood twigs or other twigs from the tree in which they are nesting. The majority of all nests found have been within one-half mile of surface water.

Unfortunately, many of the riparian zones used for nesting are privately owned and are gradually deteriorating from excessive livestock grazing (which is preventing normal tree reproduction) and other land uses. Many of the nesting zones are in highly scenic canyons, such as Arivaipa Canyon, which attract large numbers of recreationists during late spring, just when the birds are beginning to lay eggs and start incubating. This human disturbance causes considerable nest abandonment in some canyons. Usually the birds will attempt to re-nest in an adjacent area, but such re-nesting attempts are frequently unsuccessful. Sometimes, birds at nests will sit "tight" on a branch in the tree canopy while humans pass close by; at other times they will leave the nest and fly overhead, calling excitedly.

Nest Survey Methods

Aerial surveys are useful in searching for suitable nesting areas along isolated riparian zones or other streams which the biologist is not familiar with. Areas containing large trees, such as cottonwoods, may be mapped and then visited on the ground to search for nests. Cottonwoods may be the only trees that have leafed out by the time the Black Hawks begin to nest; this is why cottonwoods are apparently used more than other trees. Nests probably cannot be seen from the air once the leaves are on the trees. Most nest surveying is conducted by walking along suitable stream bottoms and watching for either adult birds or for nests high in the trees with the aid of binoculars. Where the riparian zones are bounded by cliffs, the hawks will commonly use rocky perches on the cliffs for roosting and observation points.

Nest Survey Methods

Aerial surveys should be first employed to map out riparian zones that contain large tree types, such as sycamores or cottonwoods, that would be suitable as nesting trees for this species. Once the most likely looking riparian zones are determined, the survey becomes one of systematically searching for nests from the ground, using a good pair of binoculars. The nests are usually high in the canopies and may easily be missed if they are new. Normally, a general search of riparian zones is made to detect nests of all species using this specific kind of habitat, including Cooper's Hawks, Sharp-shinned Hawks, Gray Hawks, Black Hawks, Red-tailed Hawks, Great Horned Owls, Screech Owls, Saw-whet Owls, Long-eared Owls, and others depending on state and locality. Nests are most readily found by watching for adults flying nearby, observing their behavior, and then searching for nests in the vicinity they occupy most.

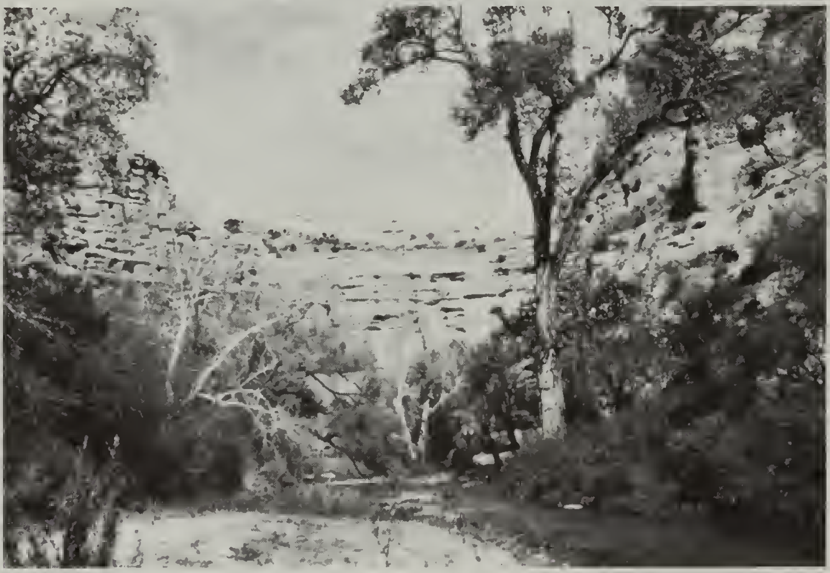


Fig. 85. Typical nesting habitat of the Black Hawk and Zone-tailed Hawk along riparian zones in Arizona.

Harris' Hawk
(Parabuteo unicinctus)

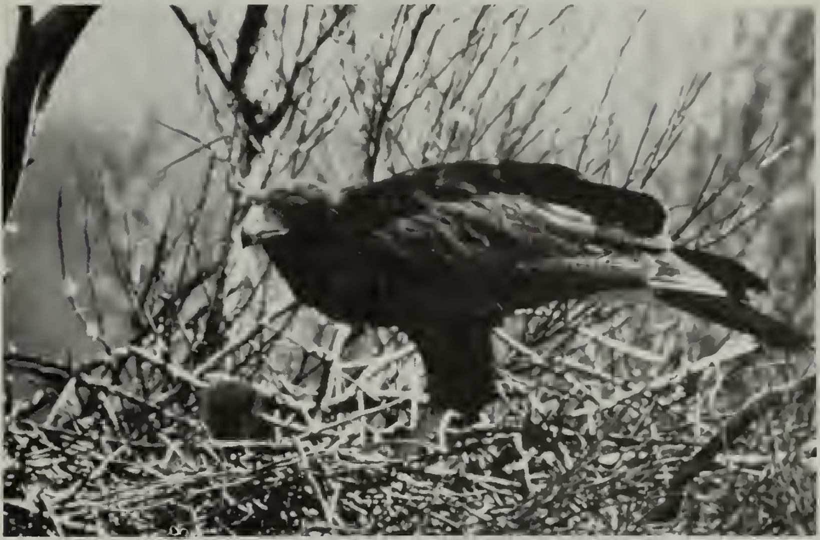


Fig. 86. Harris' Hawk at nest.

Nest and Habitat Characteristics

The Harris' Hawk is a common Mexican species that is found in the United States primarily in Texas, New Mexico, and Arizona. In the vicinity of Phoenix and southward it is farily common, nesting primarily in the tops of saguaro cacti and large bushes or trees, such as Palo Verde trees. The nest appears much the same as that of the Red-tailed Hawk which also nests in the tops of saguaro cacti in this area. It is constructed primarily of small to medium-sized twigs found scattered on the desert floor and lined with grasses, leaves, green mesquite, elm shoots, bark, Spanish moss, or roots. The nest may also be built in chaparral, mesquite, hackberry, or other trees. Generally, the nest is fairly low, being placed from about 10 to 30 feet above the ground.

The Harris'Hawk clutch usually consists of three or four eggs, sometimes five. The birds are known to practice polygyny, one male caring for two females which sometimes use the same nest. They also commonly have two clutches per year and the young from the first clutch have been observed helping feed the young in the second nesting.

Harris' Hawks may be found scattered across the Southwestern deserts and are not tied to riparian habitats like the Black, Gray, and Zone-tailed Hawks. This species and the Red-tailed Hawk are the dominant hawks of Southwestern desert regions.

Nest Survey Methods

Aerial surveys will assist the biologist in locating nests in saguaro cactus country, where nests are easily seen in the top forks of these plants, but nests in Palo Verde trees or other types of trees or bushes are very difficult to see from the air. Nests are most often located by driving desert roads that traverse suitable nesting habitats and watching for adult birds either soaring or perched on top of saguaro cacti or powerline poles. Their dark coloration readily distinguishes them from the white-fronted Red-tailed Hawks that may be common in the same area. While these hawks commonly nest in very dry environments, they may also utilize trees of the riparian zones as nesting sites, so these areas should also be checked.

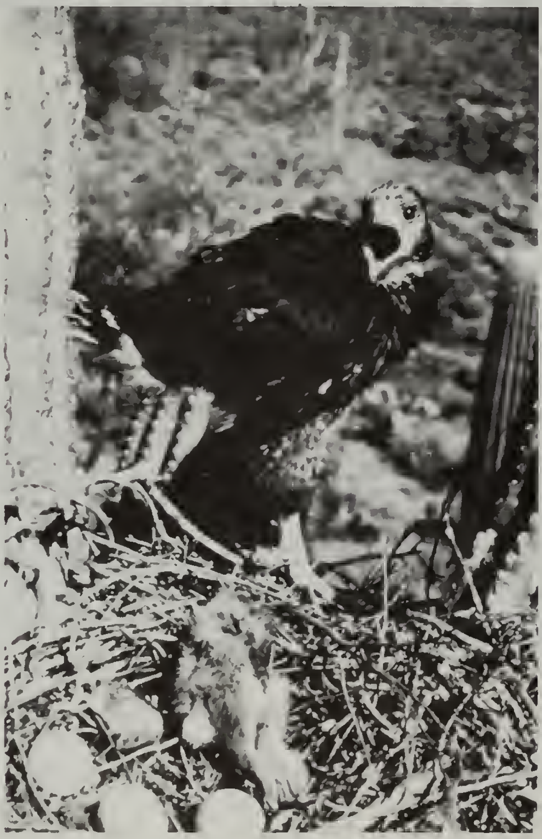


Fig. 87. Typical nest of Harris' Hawk in saguaro cactus in Arizona.

Gray Hawk
(Buteo nitidus)

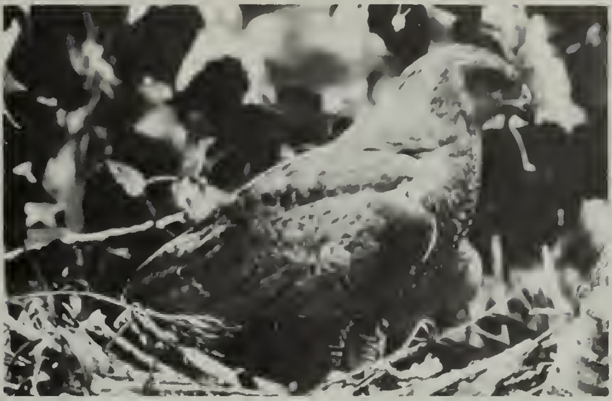


Fig. 88. Gray Hawk at nest.

Nest and Habitat Characteristics

The Gray Hawk, like the Zone-tailed Hawk and Black Hawk, represents the northern extension of a Central American species into the southern United States. Its primary nesting habitat is found in southern Arizona, almost entirely along riparian zones under private ownership. Its survival in the United States depends entirely on land use activities planned and conducted by private landowners. It is to be recommended that land exchanges be made, either by the State of Arizona or the Bureau of Land Management, with private landowners to obtain and manage its key riparian nesting habitats to assure the survival of this beautiful bluish-gray hawk. Surveys already conducted by researchers in Arizona have located *no* nests on public lands.

Nests are commonly used year after year and gradually develop considerable bulk, but are still smaller than old Red-tailed Hawk nests. They are built mostly of small to medium-sized twigs and lined with leaves or weeds. Nests are constructed only in high bushes or in trees lining water courses. Many nesting sites have been lost because of dams constructed along rivers, channelization of streams, or destruction of trees to create more farmland or to reduce water utilization.

Nest Survey Methods

Aerial flights conducted to determine suitable habitats for other species, such as Black Hawks and Zone-tailed Hawks, will apply as well to Gray Hawks. Suitable stretches of river or stream can then be searched for nests by carefully and slowly walking stream bottoms and watching for either the adult birds or their nests. The adults are quite vociferous when their nests are approached by humans, especially if young are in the nest. Therefore, surveys are best conducted at such time as one would expect to find young present, as indicated in the Appendix.

Marsh Hawk
(Circus cyaneus)

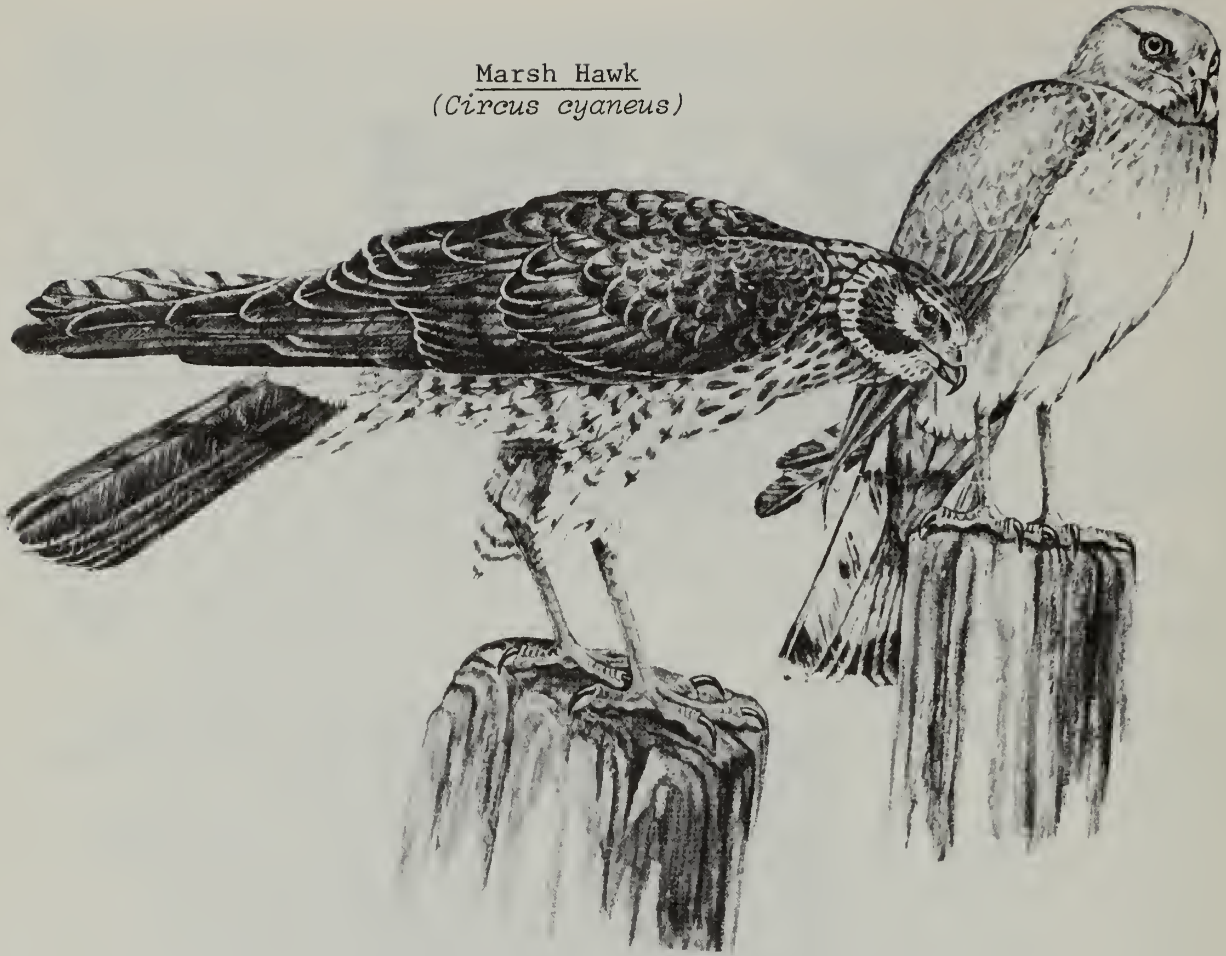


Fig.89. Female (left) and male (right) Marsh Hawks.

Nest and Habitat Characteristics

Marsh Hawks (Harriers) may be found nesting in all of the western states. While it seems to prefer to nest in the vicinity of marshes, rivers, or ponds, it may be found nesting in grassy valleys or on grass and sagebrush flats many miles from the nearest water. In general, it prefers saltwater marshes, wet meadows, sloughs, and bogs for its nesting and foraging habitat. Where these are absent, it hunts open fields and is frequently observed hunting over agricultural areas.

The nest is a flimsy to well-made structure of sticks, straws, grasses, or other small materials. Sometimes the nest will be built in reeds or bullrushes over water if they are matted down and will support a nest. The nest cup and structure usually become inconspicuous after the young hatch and begin moving around in the vicinity of the nest, seeking shade, etc. Normal clutches consist of from 4 to 6 eggs, occasionally more.

Polygyny has been reported for this species, i.e., one male defending nests of 2 females in the same area.

Nest Survey Methods

Marsh Hawks are frequently observed flying low over field and marsh, searching for mice, snakes, or other prey. The white rump patch and high dihedral of the wings makes the bird easy to identify. The females are brownish, while the males are slate-gray with white breasts. The only practical method for locating their nests is to drive all available roads around fields, sloughs, etc., watching for the adult birds. When located, the adults should be watched until they drop into the grass or brush. Then approach the spot, keeping your eyes fixed on the last spot where the bird was observed. After the young hatch, the adults will return to the nest quite often with food. The only other suitable method for locating nests is to use dogs, or to systematically search marshy areas or fields where the birds have been seen and hope to flush the bird from its nest. It is generally unfruitful to search for a Marsh Hawk nest unless an adult has been observed flying in the area.

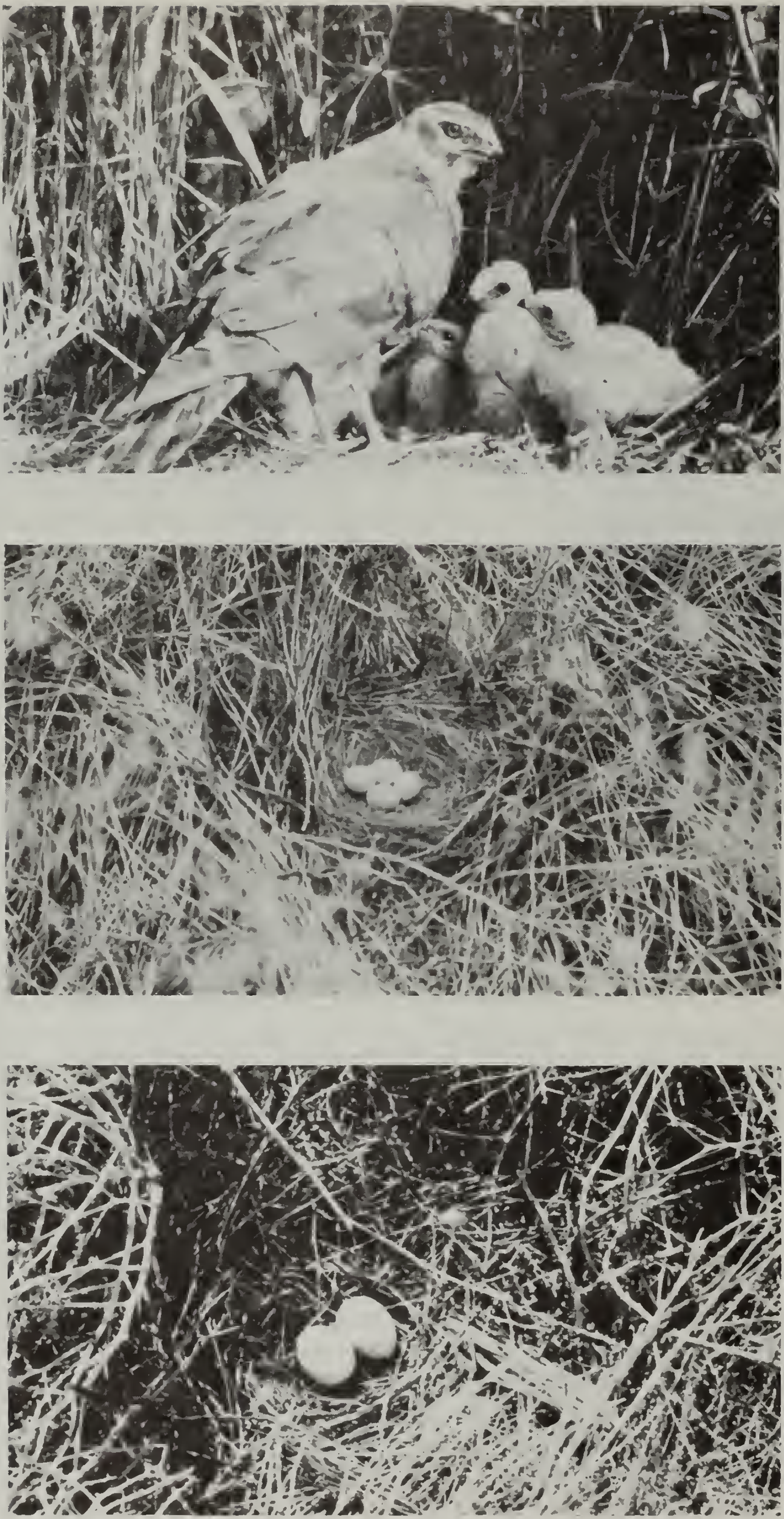


Fig. 90. Typical Marsh Hawk nests.

Turkey Vulture
(Cathartes aura)

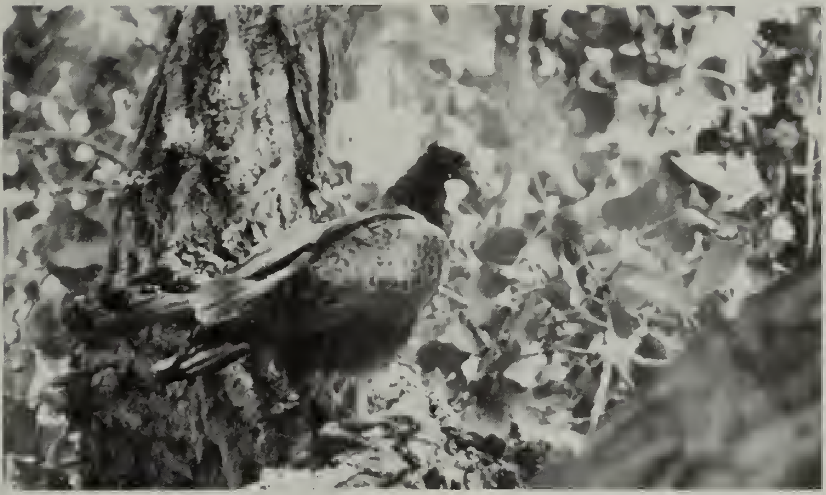


Fig. 91. Turkey Vulture.

Nest and Habitat Characteristics

The Turkey Vulture is one of the most common avian scavengers in the United States. Cliffs are the most common nesting sites throughout the West, but occasionally tree nests are found. Nests are usually built out of reach of terrestrial predators, possibly because of the odoriferous condition of the nesting site, a characteristic of carrion-feeding birds.

The nests are usually in clefts or cavities in sheer cliffs, often as high as 12,000 feet elevation in high mountains. In Colorado, they have been noted nesting in the tops of trees, along with Great Blue Herons, but this is very unusual. Nests have also been found on the ground under vegetation, in fallen hollow logs, in broken tree stubs at considerable heights, or in caves.

Nest Survey Methods

Nests of this vulture are best found by watching for the adult birds soaring in a particular area and then observing them until they go to their nests. Since the birds are quite wide-ranging in search of food, this may take considerable time. However, when the birds are seen in the vicinity of cliffs, it is possible that their nest sites are nearby, and they should be watched as long as possible. Usually, if adults are commonly observed frequenting a particular area, one can assume that their nests are not too far away.

California Condor
(Vultur californianus)

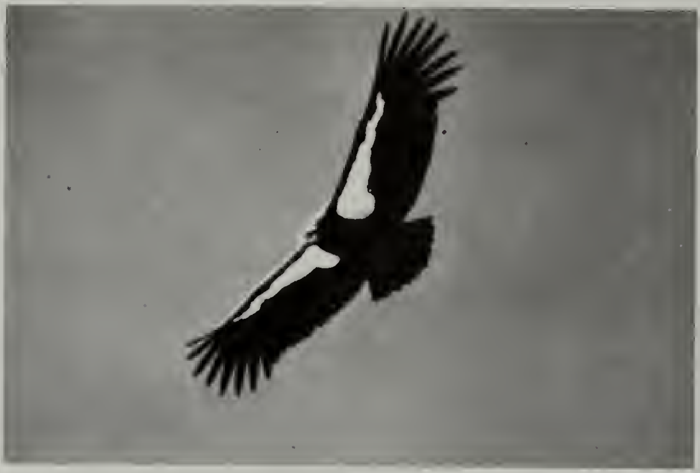


Fig. 92. The Endangered California Condor

Nest and Habitat Characteristics

Possibly less than fifty of these magnificent vultures still survive in the wilder portions of southern California, among the most rugged and rocky gorges and canyons of the less frequented mountain ranges.

The condor lays its single egg on the bare soil, gravel, or rocky floor of some more or less inaccessible cave or crevice in a cliff, or under rocks or boulders on the side of a mountain canyon. Sometimes the crevice is barely large enough to admit the bird and at other times it is quite open.

The California Condor lays only one egg in a season; and apparently it does not lay every year. Hence, it reproduces very slowly. Fortunately, the birds are relatively long-lived, having been known to live in zoos in excess of fifty years. Some of its more crucial habitats in California are being set aside and officially designated as Critical Areas. (1).

Nest Survey Methods

Those who have conducted specific research on this great bird generally know where its primary nesting habitats are located. Forest Service, Bureau of Land Management, and California Department of Fish and Game personnel are aware of its general nesting areas, but specific nests are still difficult to find. In general, no disturbance of its nests can be tolerated, since any disruption of its nesting sequence may mean the loss of another very critical egg or young bird.

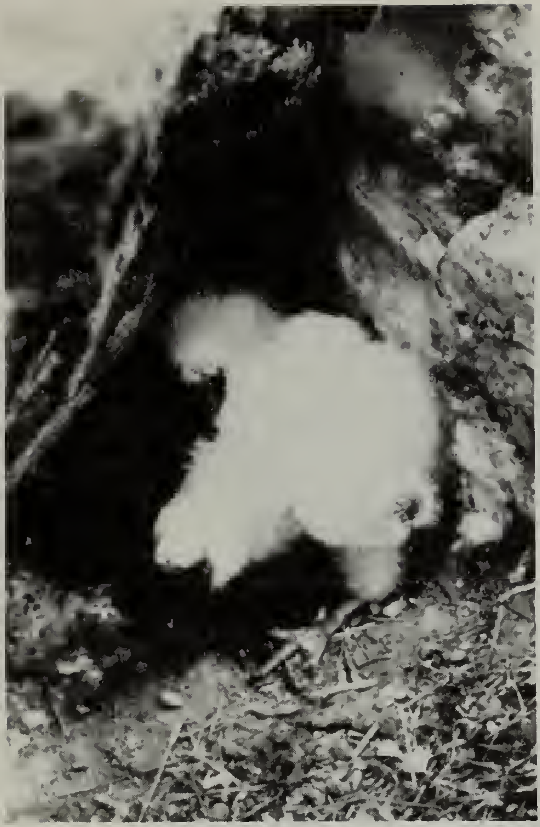


Fig. 93. Turkey Vulture nest site with young. As pictured, these birds sometimes nest on the ground between boulders or under trees on hillsides.

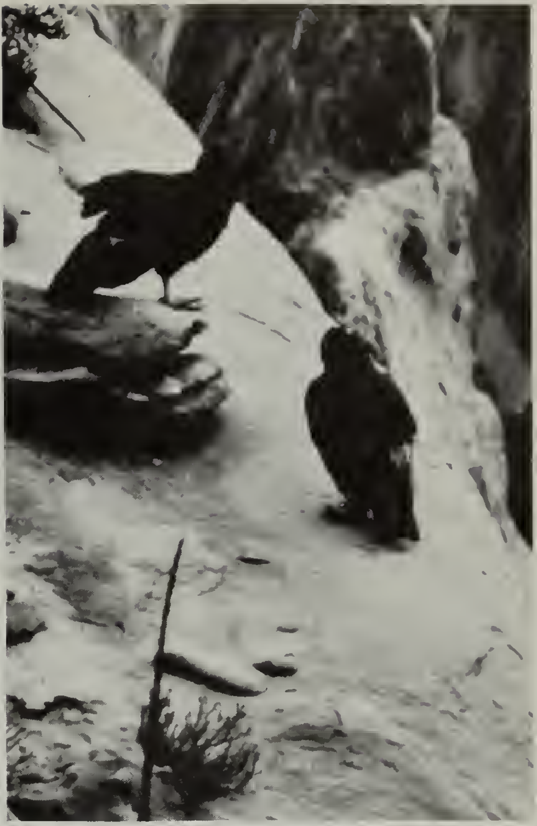


Fig. 94. California Condors on ledge near nest in southern California.

Common Raven
(Corvus corax)

Nest and Habitat Characteristics

The Raven is classified by some as a raptor, and not by others. It is included in this bulletin because its food habits are much the same as some of the raptors that are included.

The Raven is well distributed throughout the West and probably nests in every western state. They range the rugged mountainous country but are apparently equally at home over the rolling, sage-covered hills of lower elevations. They commonly compete with Magpies and Golden Eagles for rabbits or other mammals crushed on the highways.

The Common Raven nests in cavities in cliffs, in a variety of different types of trees, both coniferous and deciduous, and on different types of man-made structures, including powerline poles. They may construct their own nests, which are fair sized structures of medium-sized twigs, or they may appropriate the old nests of other raptors. They seem to prefer to nest under some type of rocky overhang than completely exposed to the elements. The nest is usually lined with shredded bark, grasses, or other fine material.

Nest Survey Methods

Raven nests are usually found while searching for other raptor nests, either in cliffs or in tree stands. Aerial flights usually turn up a few Raven nests in cavities or on ledges of cliffs where the observer may be searching for Golden Eagle or hawk nests. Wherever adults are observed during the nesting season, there is probably a nest nearby in a rocky outcropping or other suitable site. If the observer watches the birds, they will usually go directly to the nest site. With a little experience with any raptor, the biologist eventually learns about how far from its nest a raptor will range and how the bird behaves in the vicinity of its nest, especially when an intruder approaches. Behavior patterns will vary somewhat, depending on whether the nest is in a cliff or canyon, or whether it is in open country.

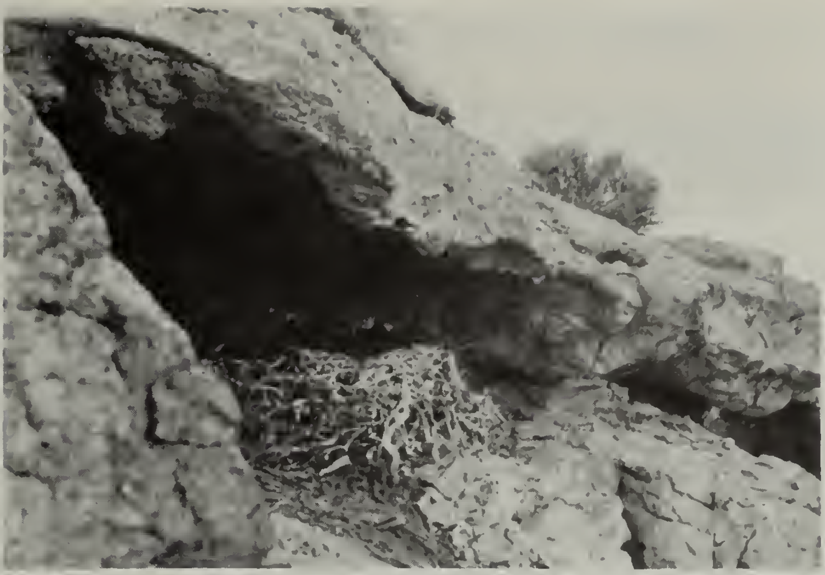


Fig. 95. A usual nesting site of the Common Raven in a cavity in a cliff.

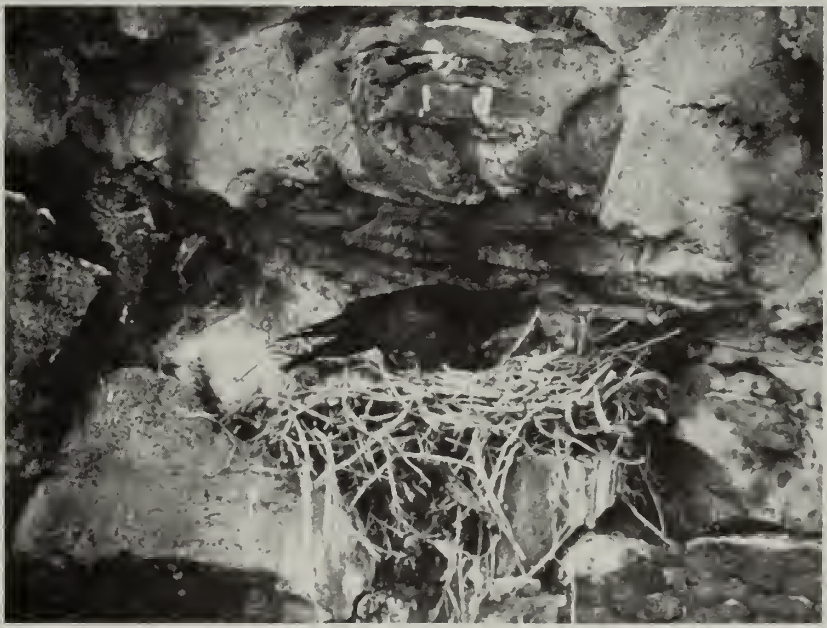


Fig. 96. A Raven nest on a ledge on a cliff face, showing nest structure and eggs.

NOCTURNAL SPECIES NEST SURVEYS

Surveys for Owl Nests and/or Territories. Many species of owls inhabit the public lands of the West, but because of their nocturnal habits it is very difficult to locate the birds and their nests, especially the smaller and more secretive species. Owls may nest in holes or cavities of cliffs or trees, in nests constructed by other birds, on the ground, or in holes in the ground. The biologist should become knowledgeable of the different nesting requirements of the various species so that he may make specific species nest surveys or watch for them during other raptor surveys. In searching for owls it may be advisable to survey by habitat types, i.e., look for owls nesting on, or in, the ground, or owls nesting in trees in other birds' nests, or owls nesting in cavities in trees.

Owls that normally use small cavities such as flicker holes in cottonwoods, saguaro cacti, etc., include the Elf Owl, Screech Owl, Whiskered Owl, Ferruginous Owl, Flammulated Owl, Boreal Owl, Saw-whet Owl, and Pygmy Owl. Owls that use larger cavities, such as those created by broken branches or tree trunks, include the Great Horned Owl, Barred Owl, Northern Spotted Owl, and the Hawk Owl. The Hawk Owl also sometimes uses the old stick nests of other birds.

Owls that commonly use the stick nests of other birds include the Great Horned Owl, Long-eared Owl, Great Gray Owl, and Hawk Owl. The Long-eared Owl commonly uses old Magpie or Cooper's Hawk nests, while the Great Horned Owl and Great Gray Owl utilize old Raven nests and other larger raptor nests.

Ground-nesting owls include the Burrowing Owl, Short-eared Owl, and Snowy Owl. Burrowing Owls utilize the burrows of prairie dogs, rabbits, badgers, or other hole-digging rodents. The Short-eared Owl nests in grasses, weeds, or shrubby areas in practically any grassy location. No nest is constructed. The Snowy Owl of the North nests amongst the lichens or in grassy areas of the tundra.

Barn Owls will nest in a variety of man-made structures, including old abandoned cement plants, mining buildings, barns, silos, and houses, as well as in cavities in dirt banks or cliffs.

Surveying of nesting owls is best accomplished during the period of breeding and egg-laying when most owls will respond to an imitation of their own hoot or call. The owl's nest can generally be assumed to be in the vicinity of the owl which has been located by its responding call (there is no way short of time consuming daylight searches and observations to differentiate between mated and unmated owls that may respond). Once the responding owls' locations have been plotted on a map, searches may be made in daylight and nests located. Caution should be used in soliciting responses from owls during the daytime as aerial predators (accipiters) may be attracted which could destroy either the adult owls or their young.

If the biologist desires to determine all species of owls using a particular woodlot or canyon by using taped owl calls, he should start his survey by playing the tape recorder or using voice imitations for smaller owls first and then gradually proceed with calls for the larger owls. The Great Horned Owl call should be the last one used. Reversing this procedure usually produces poor results, since larger owls intimidate and sometimes prey on smaller owls, making them reluctant to answer a call if a large owl is thought to be in the vicinity.

Great Horned Owls are fairly easy to survey in areas where deciduous trees predominate because the owls begin nesting in late February or early March when trees are still leafless, making it fairly easy to see the adult owl sitting on the nest. This, of course, is not true in coniferous tree stands. Nests can usually be located by driving the available roads and examining all stick nests with the aid of binoculars. Great Horned Owls create a conspicuous hump on a stick nest that is easily seen. Great Horned Owls also nest in cavities in cliffs. Such nest sites may or may not exhibit "whitewash" excrement from the young, depending on the type of cavity. Throwing objects at holes suspected of containing nesting owls will frequently cause the birds to flush, but not always. Owls will often use junipers and other conifers for nest sites, and in such places will need to be surveyed on an individual site basis, searching groves of trees for any type of stick nest that could be used. Even old Magpie nests are sometimes used by Great Horned Owls and other species. Striking trees with a stick or other object will often cause small owls, such as Saw-whet Owls, to reveal themselves if they are nesting or hiding in small cavities in trees.

In searching for owls, one should watch for pellets at the base of trees or cliffs. All birds of prey form pellets from the indigestible portion of their food and these are periodically regurgitated by the birds. Researchers can determine many of the food habits of the birds by studying the pellets, and they are also an important clue to the presence of owls or other raptors. Barn Owls, for example, that nest in cliffs, or banks, will leave a scattering of pellets beneath their roosting or nesting hole, making it easier to detect their presence.

In surveying for the presence of owls and/or their nests, there are five recommended procedures that may be used. In discussing nest survey methods for the various species of owls, these standard methods will be referred to.

Suggested Survey Methods

Survey Method No. 1. Drive all available roads in the area and examine all old stick nests observed in trees or bushes. With the aid of binoculars or spotting scope the observer can usually determine whether or not there is an owl sitting on the nest, especially one of the larger owls. If there is any question, you should approach the nest for closer examination. If roads are not available, you may need to walk close enough to examine stands of deciduous trees scattered around the prairie or desert.

Survey Method No. 2. In coniferous stands, make a systematic search of the trees to detect the presence of any owls or old nests that may be suitable for their use. In dense conifer stands the nests of Cooper's Hawks, Goshawks, and Sharp-shinned Hawks are commonly used for nesting by the larger owls. Where juniper trees or other conifers are scattered across an area, you will need to examine them on an individual tree or clump basis. Ravens, Crows, Magpies, Red-tailed Hawks, and Swainson's Hawks frequently nest in such trees, and any of these nests are suitable nesting sites for owls such as the Great Horned Owl, Great Gray Owl, and Long-eared Owl.

Survey Method No. 3. Keep watch for any trees, either living or dead, that contain woodpecker or flicker holes or any type of natural cavity created by accident or decay. On an individual tree basis, use a club or other device to strike the trunk of any tree that contains a hole or cavity while watching the hole for the appearance of a small owl. Strike the trunk many times, since some species of owls like the Saw-whet sometimes take some arousing. If an owl does not appear at the opening, it *probably is not being used for nesting or roosting, but you cannot be sure*. For most purposes, if a bird does not appear, assume there is not one present. Trying to climb to each individual hole can be time consuming and usually not worth the effort.

Survey Method No. 4. Drive all available roads while watching for any type of rodent colony, especially prairie dogs and ground squirrels. Map all prairie dog colonies as potential nesting sites for Burrowing owls and examine all such colonies with binoculars for the presence of Burrowing owls, which often sit on the dirt mounds throughout the day. Also, during the appropriate period, the young owls may be seen with just their heads protruding above the ground surface. Burrowing owls sometimes nest in isolated holes that may occur anywhere on the desert floor. Keep an eye out for such birds.

Short-eared Owls may be found in grassy, sagebrush, marshy, or wet meadow areas throughout the West. The nest is in a slight depression and usually lined with grass and weedstalks. These owls are primarily active at dusk and early dawn but sometimes hunt during the day, especially on cloudy days. Since they are quite widespread through a variety of habitats, it is generally feasible to try to survey for them only in the more likely locations, such as areas of valleys having relatively dense grass stands and around marshy areas. Clap your hands, or otherwise produce loud noises as you walk through the likely-looking areas and you will frequently flush one or more of these owls. Also, watch for these birds whenever you are conducting inventories for other wildlife or when you are driving along old trails leading through grassy habitats. They will usually flush from about 30 to 50 yards ahead of moving vehicles.

Snowy Owls, living in northern tundra, are quite readily found with the use of aircraft during their nesting season. Their white forms, while sometimes partially blending with surrounding rocks and vegetation can still be discerned once an observer becomes trained to look for them. Keep an eye out for these birds while routinely doing other resource surveys, or make special flights if you are particularly concerned about relative populations in a specific area.

Survey Method No. 5. Obtain taped bird calls from the National Audubon Society or other sources and play back these calls at appropriate crepuscular or nocturnal periods to solicit responses from specific species. For a general owl survey, play the calls for the smaller species of owls first and end up later playing the calls of the larger owls. Hearing the calls of the larger owls might intimidate the smaller owl species and they may not respond, since they serve as prey to some of the larger owls. Driving along back-country roads and stopping about every one-quarter mile to play the calls will usually provide the biologist with considerable information about the species and abundance of owls in the area. Trial and error efforts will usually provide the biologist with the most appropriate methods to use for his particular part of the country and for the species involved.

Use of taped or voice calls for Northern Spotted Owls has proved to be very effective in Oregon. At dusk, night, or morning the caller regularly emits the call at likely looking spots and then waits for a few minutes for a response. This is repeated at periodic intervals as he proceeds through the length of the suitable habitat. Responses are mapped and the locations later checked for possible nests.

Great Horned Owl
(Bubo virginianus)

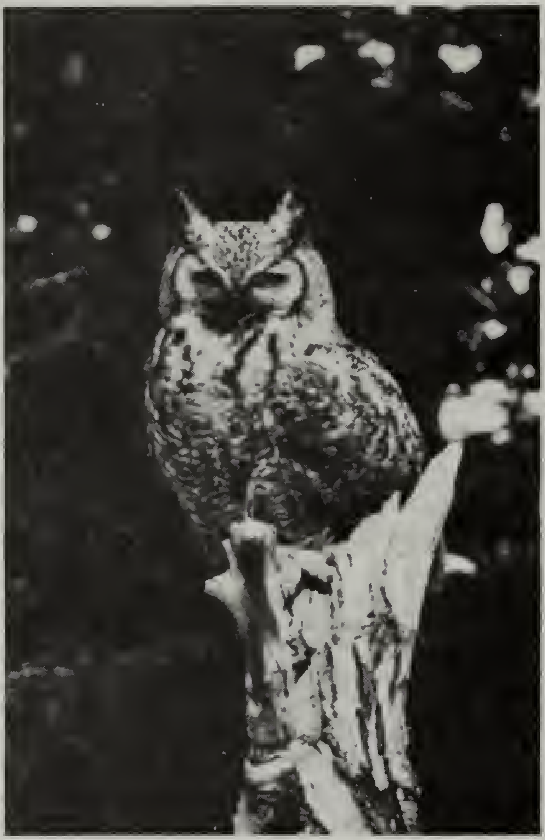


Fig. 97. Great Horned Owl.

Nest and Habitat Characteristics

Great Horned Owls are found throughout the West in deserts, forests, canyons, mountains, and open country. They are universal in distribution and will nest on practically any old nest structure that will hold the incubating bird, as well as in a wide variety of cavities in both cliffs and trees. From one to four eggs are laid, generally from late January to late March.

Nest Survey Methods

Use suggested Methods No. 1, 2, and 5.

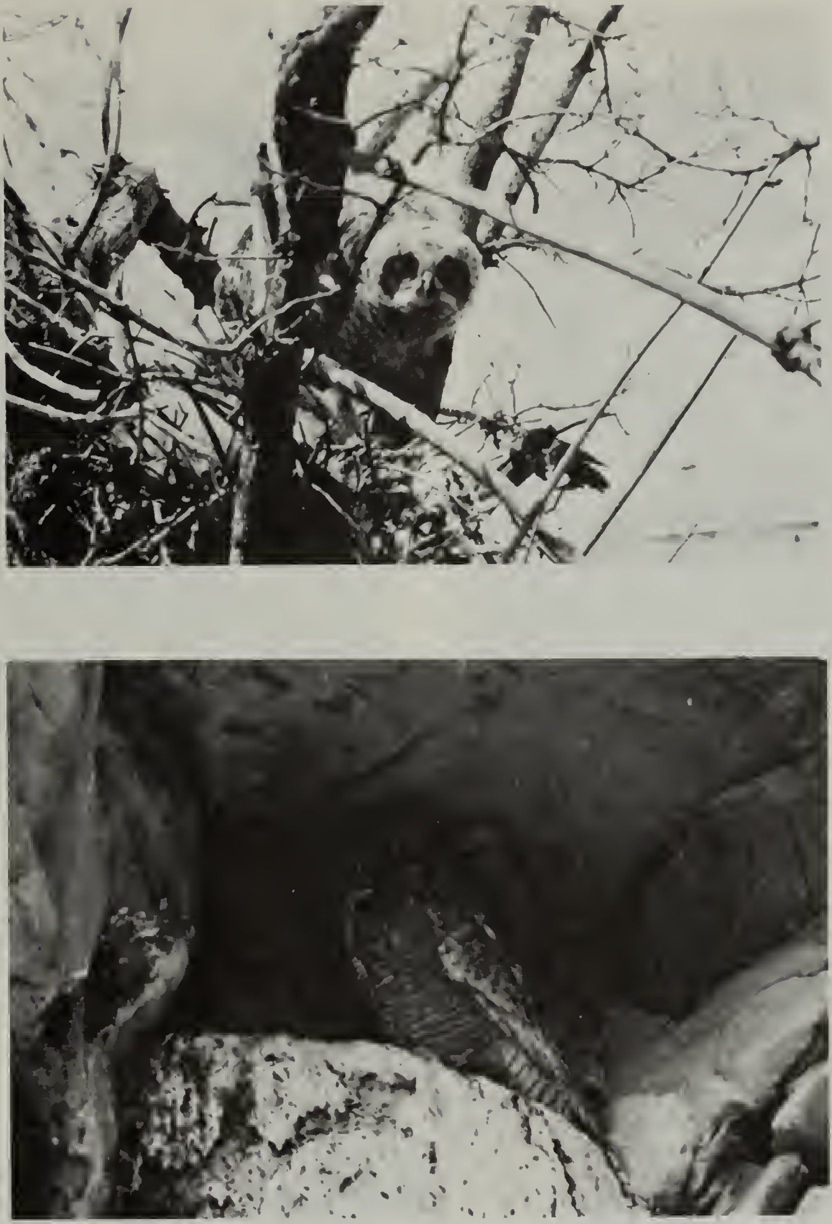


Fig. 98. Typical tree and cliff nesting sites for the Great Horned Owl.

Short-eared Owl
(Asio flammeus)

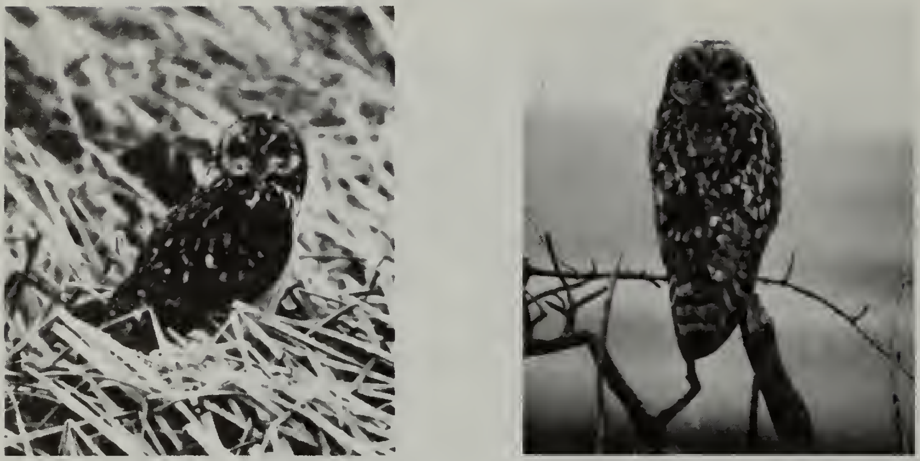


Fig. 99. Short-eared Owl.

Nest and Habitat Characteristics

Short-eared Owls may be found in a variety of habitats throughout the West, including grassy, sagebrush, marshy, and wet meadow areas. The nest may be placed in any of these habitats and consists of a slight depression that may be lined with grass or weedstalks. Sometimes the eggs are laid with little apparent effort to form a nest bowl. They always nest on the ground and may be flushed as the observer drives or walks through suitable habitats. It seems to nest more frequently around marshy or dense grass areas. This is one of the few owl species that frequently hunts during daylight hours, especially on dark, cloudy days.

Nest Survey Methods

Use suggested Methods 4 (Short-eared Owl portion) and 5.

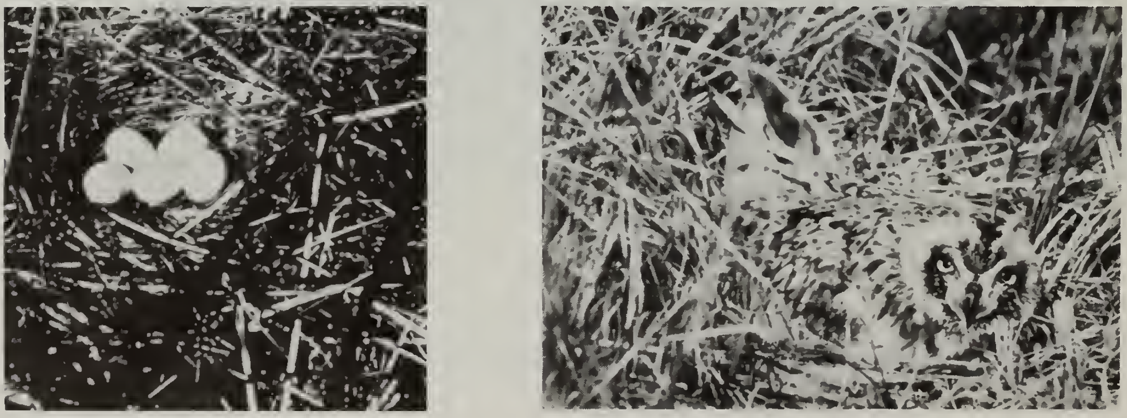


Fig. 100. Typical nesting sites for Short-eared Owls.

Long-eared Owl
(Asio otus)

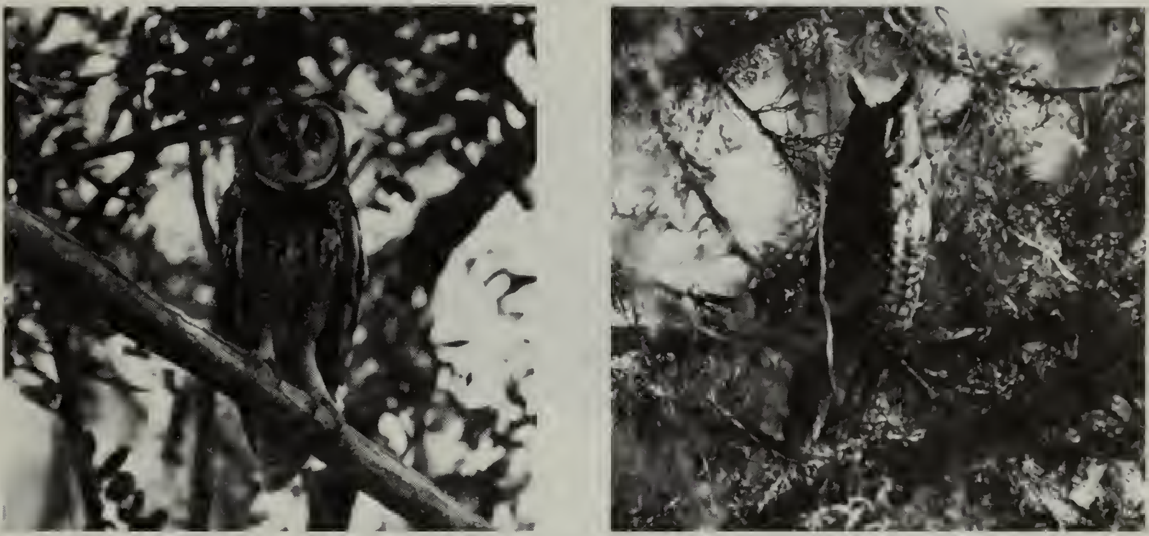


Fig. 101. Long-eared Owls.

Nest and Habitat Characteristics

This owl may be found in any area of the West where there is sufficient tree or brush growth to give it shelter for its nest and concealment during the day. It may be found in dense groves of coniferous trees in mountainous regions or in tree belts scattered along prairie streams. It seems to prefer areas having dense brush patches for roosting and is one of the most nocturnal of all owls. It usually uses an old hawk, squirrel, raven, or magpie nest as its nesting site. Old Crow, Raven, or Magpie nests in clumps of junipers or thickets of locust, willows, or other brush are commonly used. This owl has been reported to very rarely construct a nest of its own, usually a shabby structure composed of twigs of willow, aspen, etc. The birds have an uncanny capability for concealment. An old nest may appear completely empty, but when approached closely an owl will suddenly fly from the nest, coming as if from nowhere.

Nest Survey Methods

Use suggested Methods No. 1, 2, and 5. These birds sit very "tight" on the nest. Often, the surveyor needs to rap on the nest tree, or even the nest, before the bird will reveal itself. Every potential nest site must be examined closely; distant evaluations with binoculars usually will not reveal the birds.

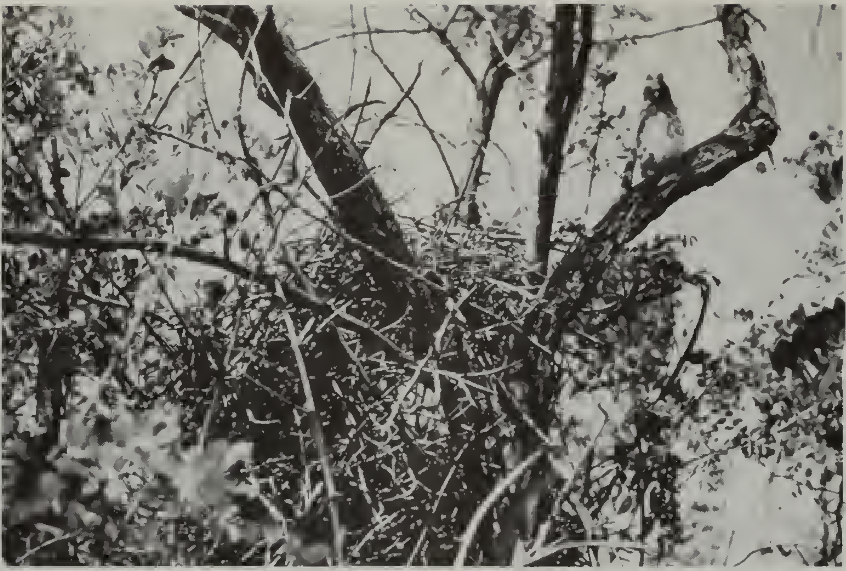


Fig. 102. Nest site of a Long-eared Owl in an old Magpie nest in a locust thicket in Colorado.

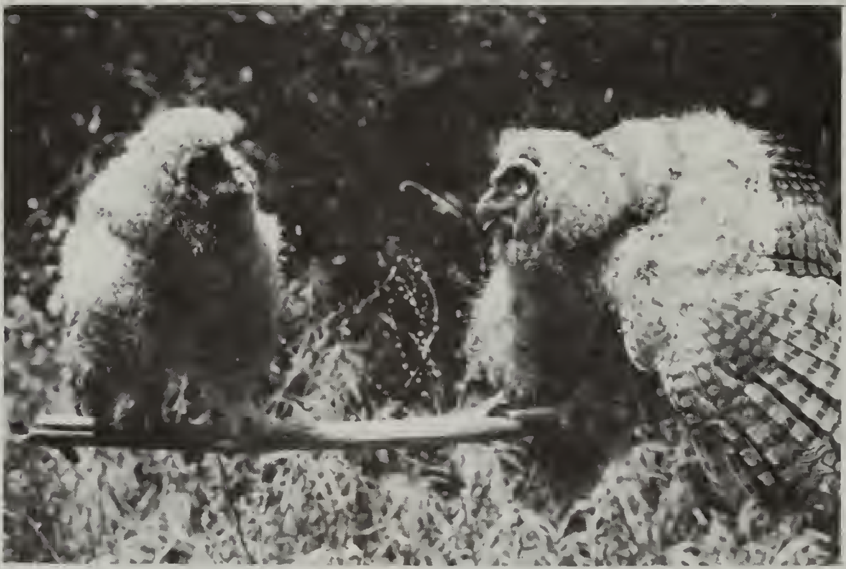


Fig. 103. A pair of young Long-eared Owls, showing distinctive facial discs of this species.

Spotted Owl
(*Strix occidentalis sp.)*

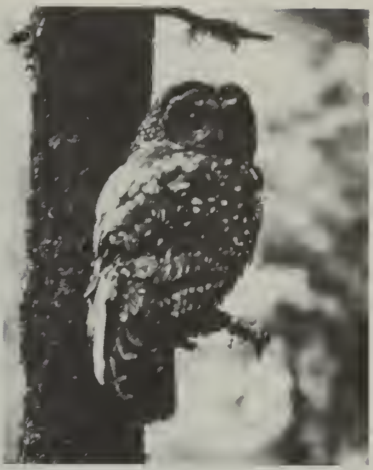


Fig. 104. Northern Spotted Owl.

Nest and Habitat Characteristics

There are three subspecies of Spotted Owls that may be found on public lands, i.e., Northern Spotted Owl (*Strix occidentalis caurina)*, Mexican Spotted Owl (*Strix occidentalis lucida)*, and the California Spotted Owl (*Strix occidentalis occidentalis*). The various species nest in different habitats, depending on their location in the West. The Northern Spotted Owl occurs primarily in heavily forested areas of western Oregon, Washington, and British Columbia. The California Spotted Owl is found on the west slope of the Sierra Nevada in forests at elevations of 2500 - 6600 feet and onto the east slope of the Sierras in the mountains north of Lake Tahoe near the California-Nevada border. The Mexican Spotted Owl ranges as far north as central Colorado, extending south along the foothills and adjacent areas east of the Front Range, through the mountainous central and southern part of the state and into eastern Arizona and New Mexico. The Guadalupe Mountains of southern New Mexico and western Texas represent the farthest southeastern extension of its range in the United States.

The Northern Spotted Owl nests exclusively in old-growth timber, usually in cavities created at the broken tops of old trees. Such "barber chair" platforms, or cavities, rarely occur in sturdy, dense stands of second growth forest. This sub-species is apparently habitat specific for nesting in the old-growth type.

Nests of the California Spotted Owl have been found on bare ground but are more often situated in trees, tree hollows and natural cliff-side cavities. One nest in Ventura County, California, which owls used repeatedly, was discovered in a roomy cavity about fifteen feet from the base of a 200-foot, north-facing granite cliff in a narrow gorge of a steep canyon. In another area, a hollow log was apparently used as a nesting site. In Riverside, California, owls laid one set of eggs on the floor of a small cave in a clay bank; another set was found at the base of a large rock on the bare ground. (13).

In Arizona and New Mexico, Mexican Spotted Owls are reported to have either constructed and/or renovated old hawk nests. The amount of actual construction by the owls is still questionable, since the basic structure usually is that of an abandoned raptor nest. The owls in New Mexico are also reported to sometimes nest in shaded fissures or cavities in cliffs in narrow canyons. They may also use old eagle or raven nests, especially in steep canyons with north-facing slopes.

Spotted Owls are generally very docile during human investigations of their nests, eggs, or young. They will sometimes perch within a few feet of the observer with little show of concern. Spotted Owls usually lay only two eggs, while three eggs is not uncommon. Four eggs are very rare.

Juvenile Spotted Owls leave the nest at a very early age, though they are still cared for by the adults. Therefore, a nest may be recently active, but the young may simply be sitting in an adjacent tree, or elsewhere in the nest tree.

The Spotted Owl is sedentary, heat intolerant, and almost totally nocturnal. Its habitat requirements reflect these characteristics.

Nest Survey Methods

Use Suggested Methods No. 2 (insofar as systematic searches of owls in suitable old-growth forest is concerned) and No. 5 (specifically calling for Spotted Owls).

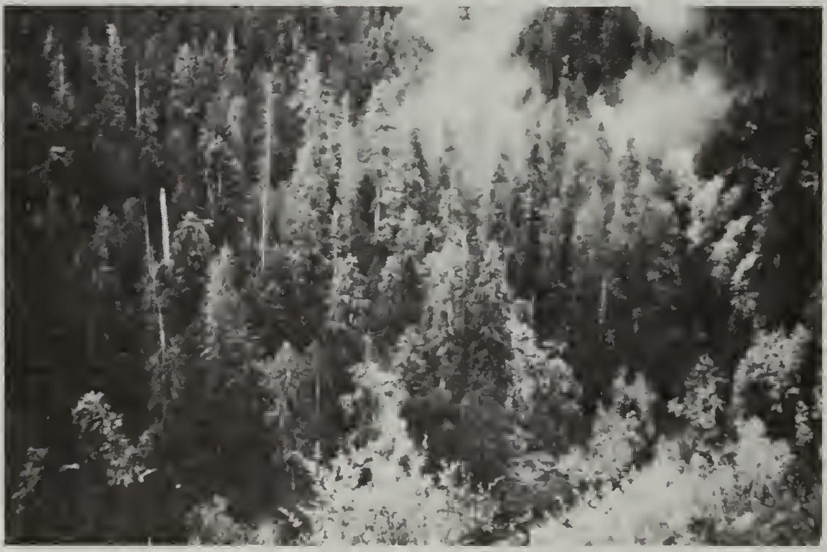


Fig. 105. Typical old growth forest used for nesting by Northern Spotted Owls.

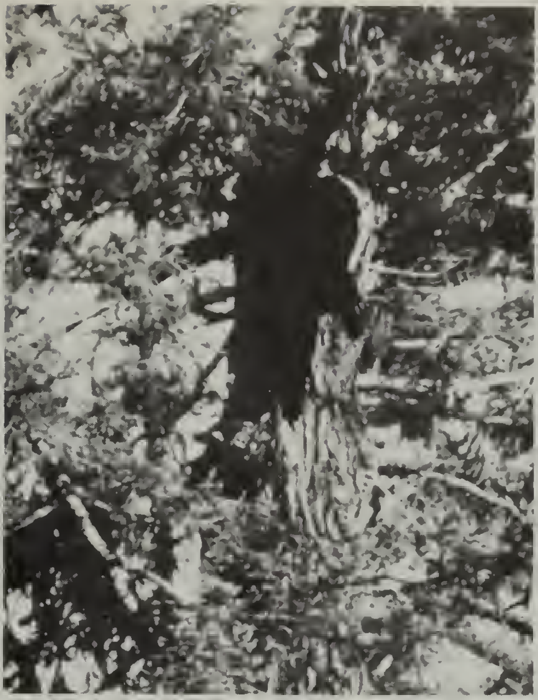


Fig. 106. A common nesting site for the Northern Spotted Owl is the cavity created when the top breaks off an old Douglas Fir tree in a dense old-growth stand.

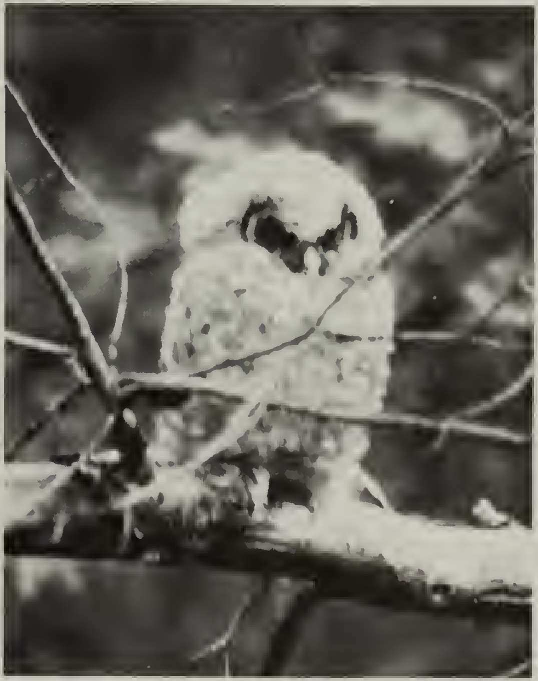


Fig. 107. Young Northern Spotted Owls leave the nest early and perch on branches until ready to fledge.

Great Gray Owl
(Strix nebulosa)

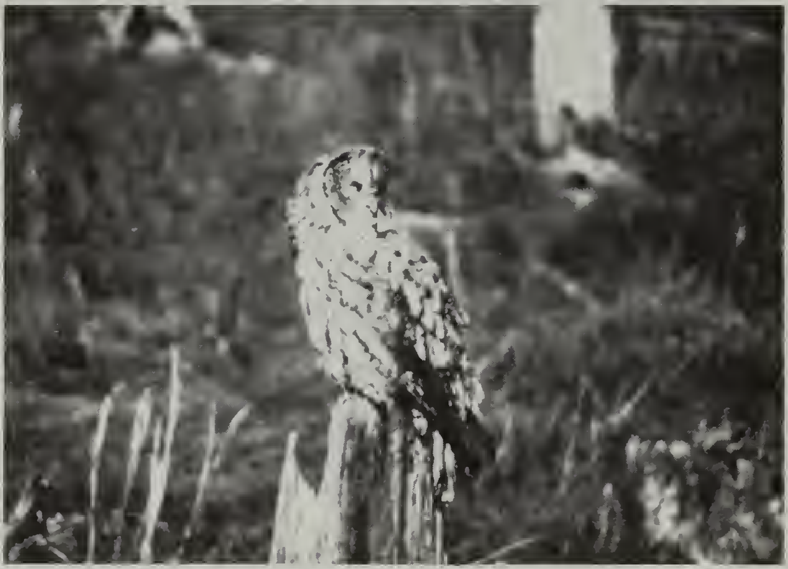


Fig. 108. Great Gray Owl.

Nest and Habitat Characteristics

This species is found primarily in Canada and the northern latitudes of the United States. It is very commonly found in deciduous forests of poplar, birch, or aspen, or mixtures of these trees with conifers. It often uses the old nests of Goshawks, Red-tailed Hawks, Raven, or Broad-winged Hawks for its nesting site. The nest may vary from 10 to 60 feet above the ground, depending largely on what old nests are available and the tree type present. Unlike other owls, it sometimes brings fresh green sprigs or needles of pines for lining its nest. The birds may lay anywhere from two to five eggs, but three is the most common number. The female may sometimes line its nest with feathers or down from her breast. (2).

Nest Survey Methods

Use suggested Methods No. 1, 2, and 5. These birds are not found around human habitations nearly as frequently as Great Horned Owls and seem to prefer the seclusion of more isolated areas. Surveying for them will likely require considerable walking through suitable habitats.

Snowy Owl
(Nyctea Nyctea)

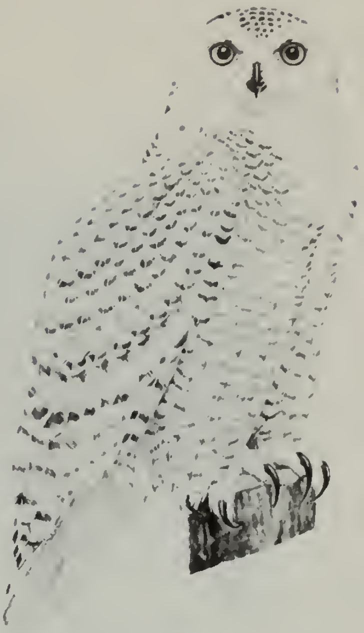


Fig. 109. Snowy Owl

Nest and Habitat Characteristics

This great white owl, one of the largest and most powerful, enjoys a wide circumpolar distribution throughout the Arctic regions of both hemispheres. It breeds north of the limits of trees on the Arctic tundras as far north as explorers have found suitable land that is not covered with perpetual ice and snow, and where it can find suitable food supply. It is by no means evenly distributed or universally abundant anywhere, on account of the periodic fluctuations in its food supply. In some regions, its abundance appears to be linked with the abundance of its favorite food, the lemming.

The nests of the Snowy Owl are ordinarily placed on the ground, usually on the highest and driest point in the surrounding tundra. Occasionally, a nesting site on a rocky ledge or a cliff is chosen. In either case the nest is but a flimsy affair at best, consisting, if on the ground, of a slight hollow scratched out by the birds, and this is usually lined with a little moss and a few feathers; if on top of a ledge or a cliff, the eggs frequently lie on the bare rock, with just enough material around them to keep them in place and prevent them from rolling about.

These owls commonly spend hours quitely perched on the summits of hillocks, where at a distance they look like small patches of snow. (2).

Nest Survey Methods

Use suggested Method No. 4. Widespread areas can only be surveyed by aircraft in remote regions such as Alaska. This is best done by systematically examining all elevated areas on the tundra for the tell-tale white plumages of the birds that may be either perched or sitting on flimsy nests.

Burrowing Owl
(Speotyto cunicularia)

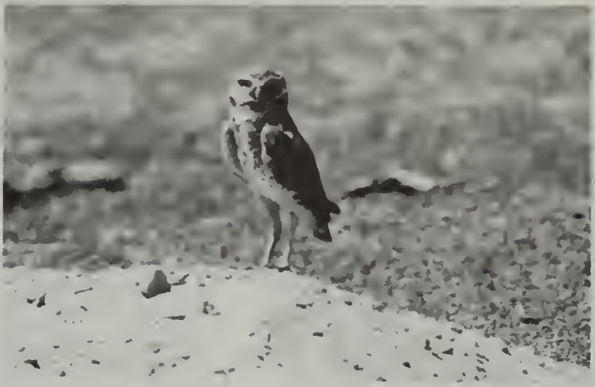


Fig. 110. Burrowing Owl at prairie dog hole used for nest site.

Nest and Habitat Characteristics

This is the only small owl that habitually perches on the ground. They commonly use the burrows of prairie dogs as nesting sites and seen at distance, they somewhat resemble prairie dogs standing on top their mounds.

These owls are migratory in the northern part of their range, returning to their habitual nesting areas by mid-April. They often nest close to civilization and are able to live compatibly with man's activities so long as prairie dog burrows or other rodent holes are not all plowed under. It is not uncommon to see them living in prairie dog colonies within city limits, with housing developments nearby.

The species occurs on the plains and in unforested areas from British Columbia south through Baja California. They were formerly very common but numbers are gradually decreasing, probably due largely to a gradual disappearance of prairie dog colonies because of man's activities. (8).

Nest Survey Methods

Use suggested Method No. 4. With the use of binoculars or spotting scopes these birds are readily visible on open deserts or prairies. While a few isolated pairs or small colonies will be missed that are scattered through brushy areas, they are still probably the easiest of the owls to survey because, early in the mornings and late afternoons they will invariably be sitting out on prairie dog mounds or on fenceposts, about to commence their search for large insects or other prey.

Screech Owl
(Otus asio)

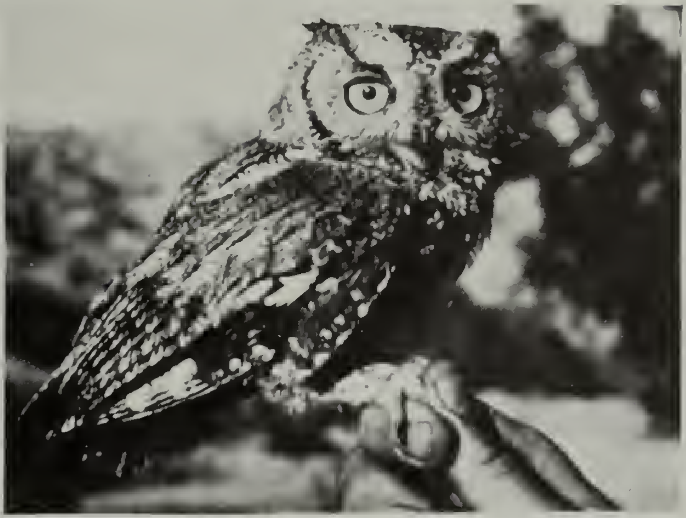


Fig. 111. Screech Owl.

Nest and Habitat Characteristics

Various races of the Screech Owl are found throughout the West. They apparently are not migratory and remain paired throughout the year. They are commonly found in wooded areas along stream bottoms where they utilize woodpecker holes for roosting and nesting. They also live in pine-clad hills up to about 8,000 feet elevation and also live in cavities in foothill stands of junipers. In the Southwest they utilize flicker holes in saguaro cacti as nesting sites.

They often remain in the same territory for several years, which may not be larger than 300 yards across. These birds are strictly nocturnal and are, therefore, more often heard than seen. (2).

Nest Survey Methods

Use suggested Methods No. 3 and 5. In surveying for this species a systematic search for and checking of flicker and woodpecker holes will be necessary. As you find each hole, rap the tree several times with a stick. If an owl is present, it will usually stick its head out of the hole to see who the intruder is. However, females incubating eggs may sit tight and refuse to show themselves. Close examination of each individual hole is too time consuming for anything but special research projects. Taped calls are often used to good advantage in soliciting responses at night.

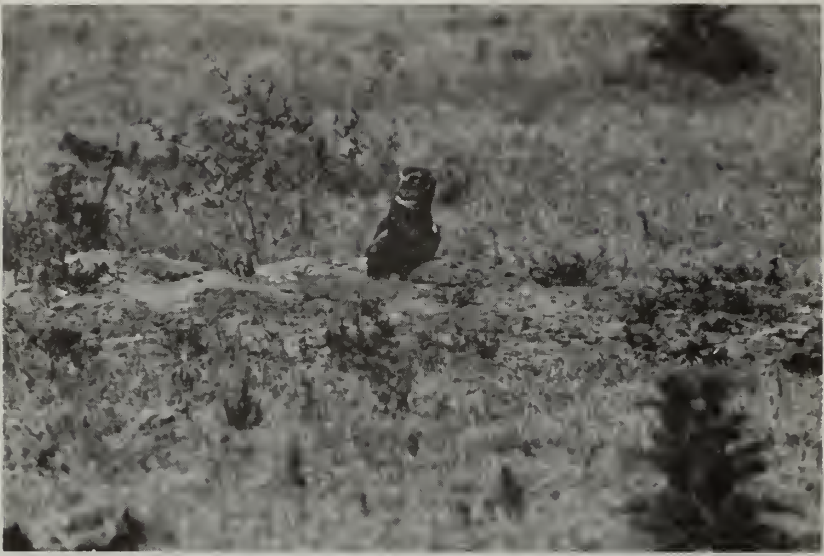


Fig. 112. Burrowing Owl on typical nesting burrow in prairie dog colony.

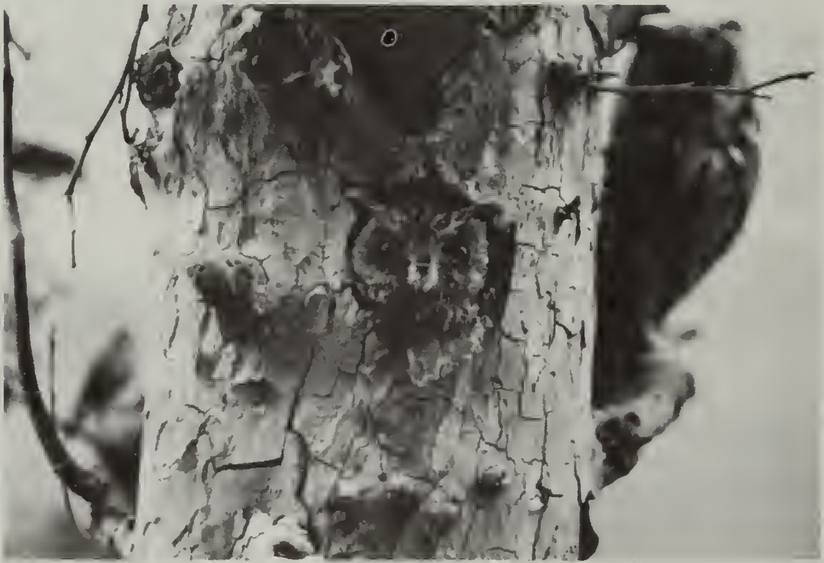


Fig. 113. Screech Owl nest in a flicker hole in a tree.

Saw-whet Owl
(Aegolius acadicus)

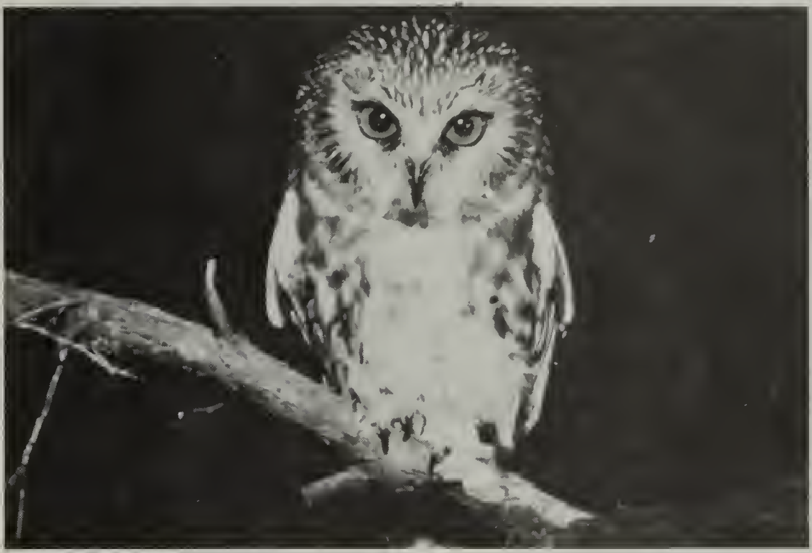


Fig. 114. Saw-whet Owl.

Nest and Habitat Characteristics

The wide-ranging Saw-whet Owls, named for their distinctive call notes, are birds of the Sonoran to Transition Zones. They are scattered through the foothills in both coniferous and deciduous tree stands and are also occasionally found living in cottonwoods along river bottoms. They sit quietly, resting by day in clumps of pines, cottonwoods, or willow thickets, escaping notice by merely remaining motionless. They are very tame, often letting humans approach to within a few feet.

They frequently roost in natural cavities or woodpecker holes where they are seldom observed unless someone or something bumps their tree or raps it with a stick. They utilize the same kinds of cavities as nesting sites, with courtship starting in February and continuing through March.

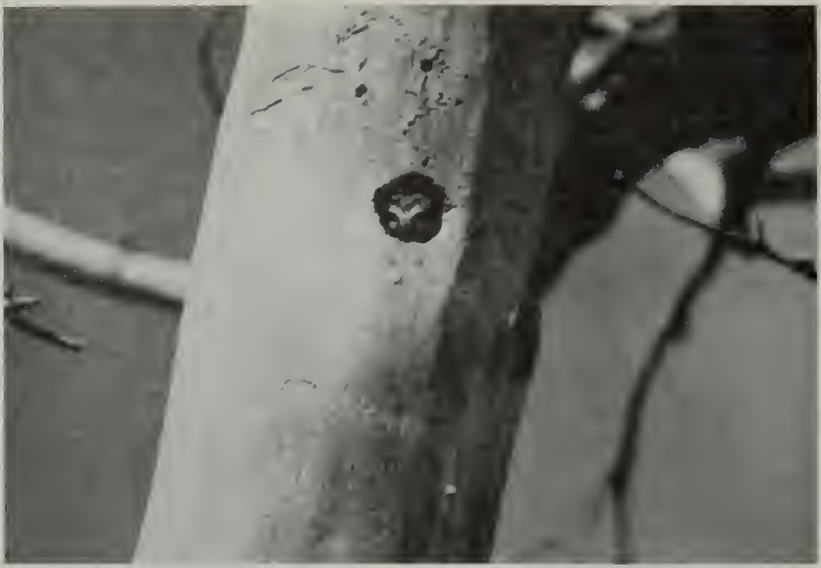


Fig. 115. Saw-whet Owl at a nest site, an old hole in a cottonwood tree.

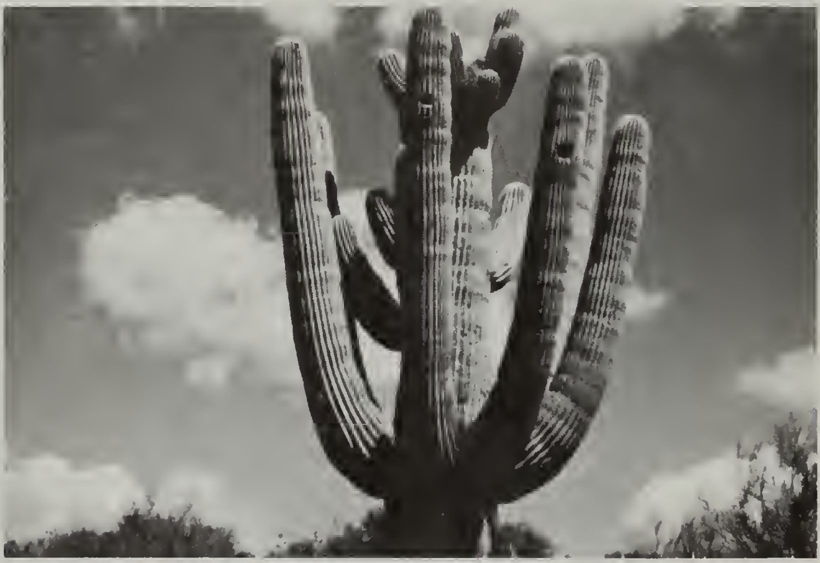


Fig. 116. Flicker holes in saguaro cacti are common nesting sites for Elf Owls and Screech Owls in the Southwest.

Pygmy Owl
(Calucidium gnoma)

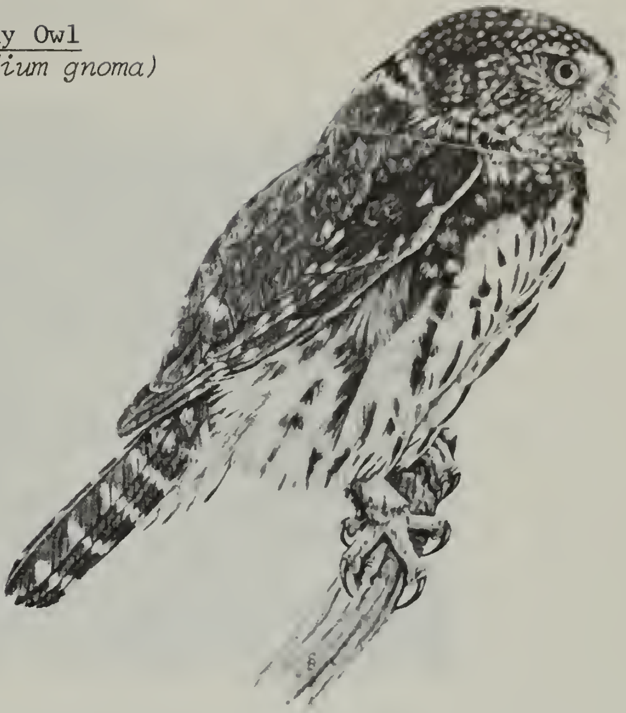


Fig. 117. Pygmy Owl

Nest and Habitat Characteristics

The little Pygmy Owls are widespread through western mountains from Alaska south to Baja California. The birds are probably non-migratory but may seek lower elevations in winter. The Pygmies range higher into the mountains than the Saw-whet and Flammulated Owls, commonly up to twelve thousand feet, and are active by day instead of being almost entirely nocturnal as are the other two owls. The call of the Pygmy, or the scolding of chickadees or juncos and other species, alarmed by its presence, are the best clues for anyone hoping to make field observations of these interesting mountain owls. (2).

Like all other small owls except the Burrowing Owl, these birds also nest in woodpecker holes or natural cavities, usually in coniferous forests. Three to four white eggs are laid in May or June.

Nest Survey Methods

Use suggested Methods 3 and 5. Since these owls usually sit tight against a tree trunk or hide in cavities during the day, they are very difficult to find and are most often found accidentally while working in the forest. Most small birds scold angrily when they find a Pygmy Owl and one of the best clues to their presence is the angry scolding of small birds that we sometimes hear in the forest.

The call of the Pygmy Owl is easily imitated, and is effective in calling up these birds. Some field workers use the call of this owl to attract small perching birds for study. By imitating its call, you can often attract small birds to within very close range.

Elf Owl
(Micrathene whiteneyi)

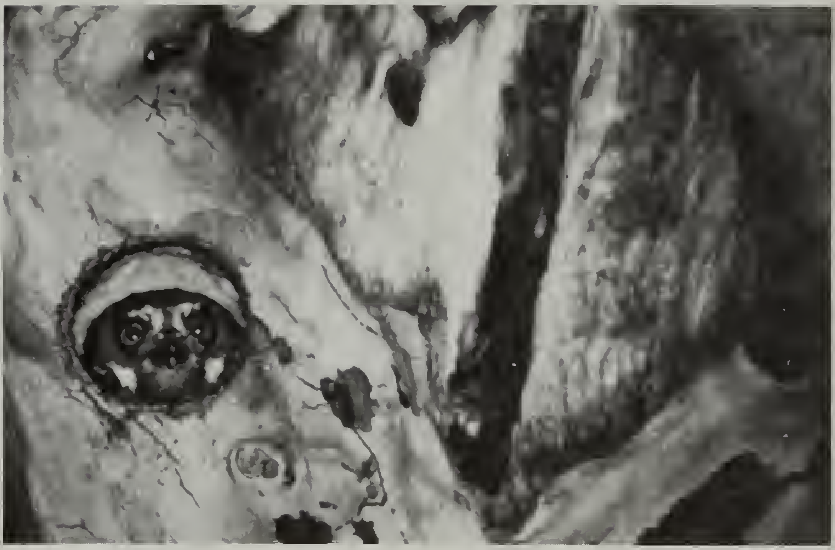


Fig. 118. Elf Owl in nesting cavity in sycamore tree.

Nest and Habitat Characteristics

The chief haunts of the Elf Owl are the low, hot, dry Lower Sonoran plains of the river bottoms and the adjacent tablelands of the Southwest, primarily in Arizona. They are not limited to the saguaro cactus belts, as many have thought, but may also be found in canyons where walnut, live oak, sycamore, and cottonwood grow, sometimes in broken, high country. (2).

The best-known nesting sites are in woodpecker or flicker holes in saguaro cacti, but they also nest in holes in deciduous trees in adjacent areas. The most common number of eggs laid is three, but from two to five eggs are normal. After starting to lay, they usually lay one egg every other day.

Nest Survey Methods

Use suggested Methods No. 3 and 5. Searches for owls in old woodpecker holes or natural cavities is always interesting. Many species of small owls, as well as many other small birds, use woodpecker and flicker holes for nesting. Birds ranging from Sparrow Hawks to Ash-throated Flycatchers may stick their heads out to see who the intruder is.

Flammulated Owl
(Otus flammeolus)

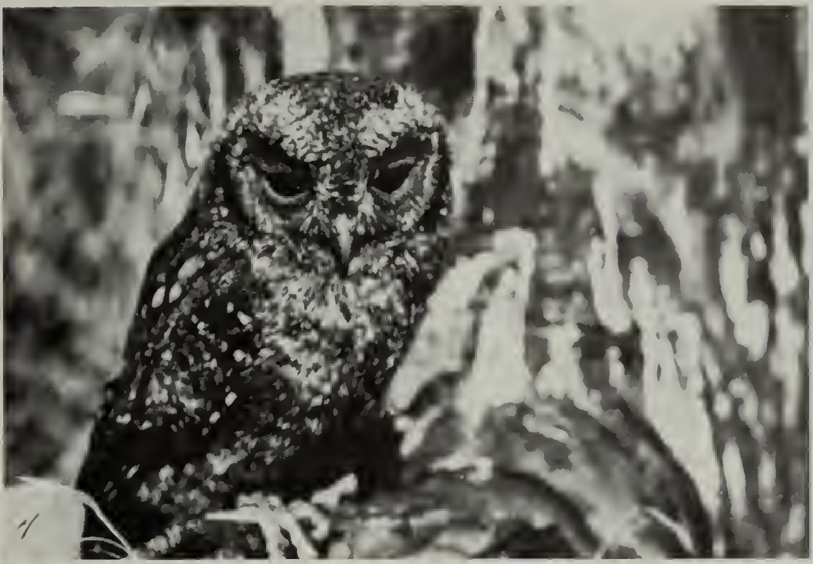


Fig. 119. Flammulated Owl.

Nest and Habitat Characteristics

This pretty and gentle little owl is quite widely distributed in mountainous regions from southern British Columbia and Idaho southward through Mexico. However, it still appears to be one of the least commonly observed owls of the smaller species. So far as presently known, they are more common in mountainous regions, from 6,000 to 10,000 feet in elevation.

The Flammulated Owl is the only small owl in North America with dark eyes. It is rarely observed since it rests during the day, roosting near the trunk of pine or fir trees. Conifers, including juniper and pinyon pine, are its predominant habitat. Eggs are normally laid in late May or early June, possibly earlier in southern latitudes, usually in old woodpecker holes. (2).

Nest Survey Methods

Use suggested Methods 3 and 5. The most feasible method to locate them during the breeding season is to be afield after dark and listen for their ventriloquistic, single hoots, which follow one after another, repeated endlessly, and when they have been heard, to work the hillsides systematically in search of nesting places.

Barn Owl
(Tyto alba)

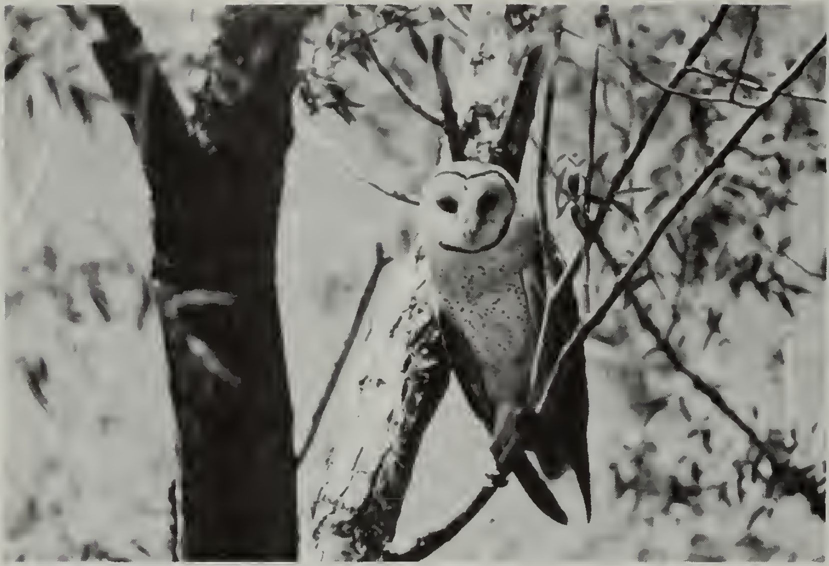


Fig. 120. Barn Owl

Nest and Habitat Characteristics

Nesting sites of the Barn Owl are quite variable and include all sorts of places, including holes and cavities in clay banks and cliffs, burrows under ground enlarged to suit their needs, natural hollows in trees, in the sides of old wells, abandoned mining shafts, in silos, barns, abandoned houses, and in the top of church steeples. Nests have even been found in exposed and unprotected places such as on flat roofs of buildings. All nests examined by the author have been in old buildings, barns, silos, water towers, or in clay banks or cliffs. They were reported by Bendire in 1892 as nesting in deserted burrows of badgers in Arizona. It is believed that the owls themselves may enlarge cavities in clay banks or ground burrows to suit their needs, using their powerful claws. (2).

In most cases, eggs are merely laid on any rubbish or debris that is present in the cavity where they are nesting. However, if the nest is in a barn or house, they may pull together some sticks, straw, or other rubbish to form a sort of nest base. The average number of eggs laid is from five to seven and up to eleven eggs is not uncommon. The eggs are pure white and mostly ovate in shape.

Nest Survey Methods

Barn Owls are most frequently located by searching old buildings, barns, silos, or similar structures where large cavities may be available for a nest. In Utah they seem to be found mostly in silos, barns, old cement plants, or abandoned mining buildings. However, in northern Colorado, they have been predominantly found nesting in cavities in clay banks and cliffs. Reasons for local preferences are unclear, so all potential types of nesting sites should be examined when searching for this species. Whenever Barn Owls are suspected of nesting in clay banks or cliffs, the biologist can easily check by examining the ground under all potential or suspected cavities for pellets, which tend to have a rather dark, amorphous shape when compared to the rather cylindrical shape for Great Horned, Long-eared, or Short-eared Owls. Such pellets will also be found in abundance at any other nesting site.

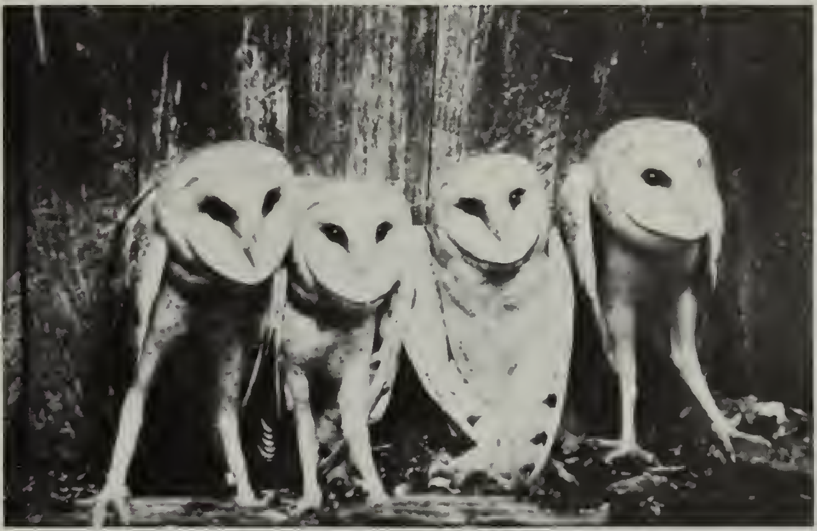


Fig. 121. Young Barn Owls at nest site in old barn.

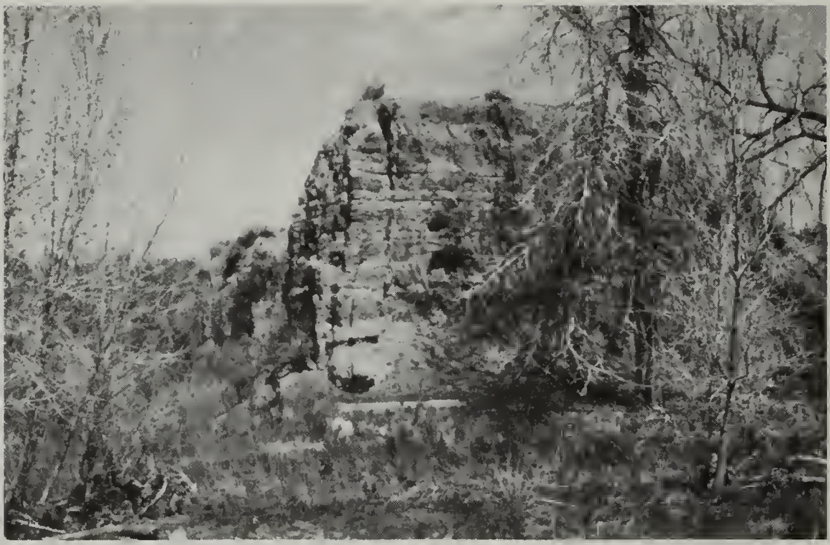


Fig. 122. Cavities in clay banks such as shown here are frequently used as nesting sites by Barn Owls.

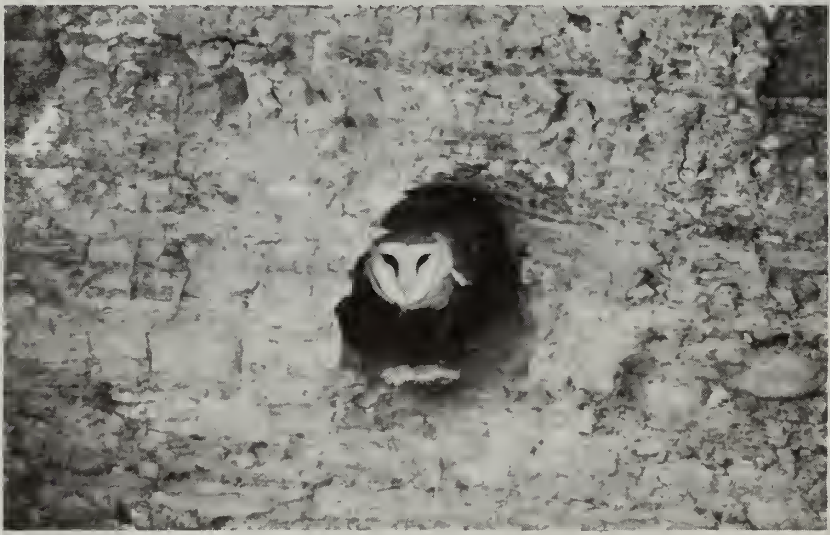


Fig. 123. These Barn Owls were nesting in a clay-shale bank in northern Colorado.

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WESTERN STATES IN WHICH BIRDS OF PREY NEST

SPECIES	AL	AZ	CA	CO	ID	MO	NV	NM	OR	UT	WA	WY
Turkey Vulture	X	X	X	X	X	X	X	X	X	X	X	X
Black Vulture		X						X				
California Condor			X									
White-tailed Kite			X									
Mississippi Kite				X								
Swallow-tailed Kite												
Everglade Kite												
Goshawk	X	X	X	X	X	X	X	X	X	X	X	X
Cooper's Hawk	X	X	X	X	X	X	X	X	X	X	X	X
Sharp-shinned Hawk	X	X	X	X	X	X	X	X	X	X	X	X
Marsh Hawk	X	X	X	X	X	X	X	X	X	X	X	X
Rough-legged Hawk	X											
Ferruginous Hawk		X	X	X	X	X	X	X	X	X	X	X
Red-tailed Hawk	X	X	X	X	X	X	X	X	X	X	X	X
Red-shouldered Hawk			X									
Swainson's Hawk	X	X	X	X	X	X	X	X	X	X	X	X
Broad-winged Hawk												
Harlan's Hawk				X	X	X						X
Harris's Hawk		X	X									
Black Hawk		X						X				
Zone-tailed Hawk		X	X					X				
White-tailed Hawk												
Short-tailed Hawk												
Gray Hawk		X										
Golden Eagle	X	X	X	X	X	X	X	X	X	X	X	X

WESTERN STATES IN WHICH BIRDS OF PREY NEST

SPECIES	AL	AZ	CA	CO	ID	MO	NV	NM	OR	UT	WA	WY
Bald Eagle	X		X		X	X			X		X	X
Osprey	X		X	X	X	X	X	X	X	X	X	X
Caracara		X										
Gyrfalcon	X					X						
Prairie Falcon		X	X	X	X	X	X	X	X	X	X	X
Peregrine Falcon	X	X	X	X	X	X	X	X	X	X	X	X
Pigeon Hawk (Merlin)	X	X	X	X	X	X	X	X	X	X	X	X
Sparrow Hawk (Am. Kestrel)	X	X	X	X	X	X	X	X	X	X	X	X
Aplomado Falcon		X										
Screech Owl		X	X	X	X	X	X	X	X	X	X	X
Great-horned Owl	X	X	X	X	X	X	X	X	X	X	X	X
Long-eared Owl		X	X	X	X	X	X	X	X	X	X	X
Short-eared Owl	X	X	X	X	X	X	X	X	X	X	X	X
Barn Owl		X	X	X	X	X	X	X	X	X	X	X
Snowy Owl	X											
Barred Owl				X	X	X						X
Spotted Owl		X	X	X	X			X	X	X	X	
Great Gray Owl	X		X		X	X			X		X	X
Hawk Owl	X											
Burrowing Owl		X	X	X	X	X	X	X	X	X	X	X
Boreal Owl	X											
Saw-whet Owl		X	X	X	X	X	X	X	X	X	X	X
Whiskered Owl		X										
Flammulated Owl		X	X	X	X		X	X	X	X	X	X
Pygmy Owl		X	X	X	X	X	X	X	X	X	X	X

WESTERN STATES IN WHICH BIRDS OF PREY NEST

SPECIES	AL	AZ	CA	CO	ID	MO	NV	NM	OR	UT	WA	WY
Elf Owl		X	X					X				
Ferruginous Owl		X										

RAPTOR NESTING SITE PREFERENCES

SPECIES	Location of Nest Ledges/Holes in Sheer Cliffs	On Low Rocky Bluffs	On/In Ground	On Man-Made Structures	In Trees, Cactus or Bushes
Turkey Vulture	X				
Black Vulture	X			X	
California Condor	X				
White-tailed Kite					X
Mississippi Kite					X
Goshawk					X
Cooper's Hawk					X
Sharp-shinned Hawk					X
Marsh Hawk			X		
Rough-legged Hawk			X		
Ferruginous Hawk		X	X	X	X
Red-tailed Hawk	X	X			X
Red-shouldered Hawk					X
Swainson's Hawk					X
Harlan's Hawk					X
Harris' Hawk					X
Black Hawk					X
Zone-tailed Hawk					X
Gray Hawk					X
Golden Eagle	X				X
Bald Eagle	X				X
Osprey	X (pinnacles)				X
Caracara					X

RAPTOR NESTING SITE PREFERENCES

SPECIES	Location of Nest Ledges/Holes in Sheer Cliffs	On Low Rocky Bluffs	On/In Ground	On Man-Made Structures	In Trees, Cactus or Bushes
Gryfalcon	X	X			
Prairie Falcon	X				
Peregrine Falcon	X				
Pigeon Hawk					X
Sparrow Hawk	X				X
Aplamado Falcon					X
Screech Owl					X
Great-horned Owl	X	X			X
Long-eared Owl					X
Short-eared Owl			X		
Barn Owl	X			X	
Snowy Owl			X		
Barred Owl					X
Spotted Owl	X				X
Great Gray Owl					X
Hawk Owl					X
Burrowing Owl			X		
Boreal Owl					X
Saw-whet Owl					X
Whiskered Owl					X
Flammulated Owl					X
Pygmy Owl					X
Elf Owl					X

RAPTOR NESTING SITE PREFERENCES

SPECIES	Location of Nest: Ledges/Holes in Sheer Cliffs	On Low Rocky Bluffs	On/In Ground	On Man-Made Structures	In Trees, Cactus or Bushes
Ferruginous Owl					X

TERRITORIAL REQUIREMENTS OF BIRDS OF PREY

SPECIES	AVERAGE TERRITORY OR RANGE	
	SQ. MI.	DIAMETER (mi.)
Goshawk	1.0 - 4.0	1.0 - 3.0
Cooper's Hawk	1.0 - 3.0	1.0 - 3.0
Sharp-shinned Hawk	1.0 - 3.0	1.0 - 3.0
Marsh Hawk	1.5 - 2.0	1.5 - 2.0
Rough-legged Hawk	.24-19.2	.5 - 8.0
Ferruginous Hawk	1.0 - 3.0	1.0 - 2.5
Red-tailed Hawk	1.5 - 3.5	2.0 - 2.5
Red-shouldered Hawk	1.5 - 3.5	2.0 - 2.5
Swainson's Hawk	1.5 - 2.0	1.5 - 2.5
Black Hawk	.5 - 2.0	.5 - 2.0
Zone-tailed Hawk	1.0 - 3.0	1.0 - 3.0
Golden Eagle	8.0 -10.0	3.0 - 5.0
Bald Eagle	2.0 - 6.0	1.0 - 5.0
Osprey	3.0 - 8.0	.5 - 3.0
Prairie Falcon	2.0 - 5.0	1.5 - 5.0
Peregrine Falcon	3.0 -10.0	3.0 - 8.0
Pigeon Hawk (Merlin)	1.0 - 2.0	1.0 - 2.0
Sparrow Hawk (Am. Kestrel)	.2 - .6	.5 - .8
Great Horned Owl	1.5 - 2.0	1.0 - 2.8
Long-eared Owl	.5 - 1.0	.5 - 1.0
Short-eared Owl	.5 - 1.0	.5 - 1.0
Barn Owl	.3 - 1.0	.3 - 1.0
Burrowing Owl	.16- .62	.20- .36

NESTING PHENOLOGY OF BIRDS OF PREY

SPECIES	Nest Building	Egg Laying	Incubation	Hatching	Fledging
Turkey Vulture		4-1 to 4-10	4-1 to 5-22	5-14 to 5-22	8-1 to 8-8
Black Vulture		3-3 tp 3-7	3-3 to 4-15	4-11 to 4-15	7-25 to 7-29
California Condor		2-23 to 2-25	2-23 to 3-22	3-20 to 3-22	9-18 to 9-20
White-tailed Kite					
Mississippi Kite	4-18 to 5-10	4-24 to 5-20	4-24 to 6-20	5-24 to 6-20	
Swallow-tailed Kite		4-15 to 5-15	4-15 to 6-9	5-6 to 6-9	
Everglade Kite				4-20 to 5-5	5-20 to 6-5
Goshawk		4-10 to 5-5	4-19 to 6-12	5-27 to 6-12	8-11 to 8-27
Cooper's Hawk	4-15 to 5-7	4-20 to 5-11	4-26 to 6-22	6-1 to 6-22	7-4 to 8-26
Sharp-shinned Hawk		5-30 to 6-15	6-8 to 7-9	7-2 to 7-9	7-26 to 8-1
Marsh Hawk	4-2 to 4-7	4-14 to 4-19	4-22 to 4-27	5-18 to 5-23	6-17 to 6-26
Rough-legged Hawk					
Ferruginous Hawk	3-10 to 3-16	3-17 to 4-1	3-21 to 5-21	4-16 to 5-21	6-4 to 7-2
Red-tailed Hawk	2-6 to 3-25	3-5 to 4-21	3-23 to 5-2	4-6 to 5-23	5-16 to 7-1
Red-shouldered Hawk	2-2 to 3-5	3-8 to 4-17	3-8 to 5-19	4-9 to 5-19	5-20 to 7-1
Swainson's Hawk	4-13 to 5-9	5-13 to 6-15	5-17 to 6-28	6-16 to 6-28	7-16 to 7-26
Broad-winged Hawk	5-7 to 5-17	5-18 to 5-25	5-22 to 5-29	6-12 to 6-23	7-11 to 7-29
Harlan's Hawk					
Harris's Hawk					
Black Hawk	3-15 to 4-15	4-15 to 5-15	5-15 to 6-10	5-20 to 6-20	6-25 to 7-25
Zone-tailed Hawk	3-25 to 4-20	4-20 to 4-27	4-24 to 5-30	5-24 to 7-1	6-20 to 7-25
White-tailed Hawk					
Short-tailed Hawk	3-10 to 4-8	3-14 to 4-10	3-16 to 4-30	4-5 to 5-1	
Gray Hawk					

NESTING PHENOLOGY OF BIRDS OF PREY

SPECIES	Nest Building	Egg Laying	Incubation	Hatching	Fledging
Golden Eagle	2-2 to 2-26	3-6 to 3-30	3-10 to 5-14	4-2 to 5-14	6-7 to 6-21
Bald Eagle	2-1 to 2-20	2-12 to 2-26	3-16 to 5-1	4-20 to 5-1	6-26 to 7-6
Osprey	4-22 to 5-31	5-21 to 6-7	5-25 to 7-10	6-23 to 7-10	7-11 to 8-1
Caracara					
Gyrfalcon		5-15 to 6-20	5-19 to 7-23	6-17 to 7-23	
Prairie Falcon		4-20 to 5-1	4-28 to 6-6	5-26 to 6-6	7-2 to 7-15
Peregrine Falcon		3-21 to 4-16	3-23 to 5-16	4-22 to 5-16	6-1 to 6-26
Merlin (Pigeon Hawk)		5-20 to 6-15	5-25 to 6-20	6-10 to 7-10	7-20 to 7-30
American Kestrel (Sparrow Hawk)	4-10 to 5-1	4-27 to 6-1	5-1 to 6-3	5-27 to 6-30	6-25 to 7-28
Aplomado Falcon					
Screech Owl	3-10 to 3-24	3-15 to 3-27	3-19 to 4-30	4-17 to 4-30	5-14 to 5-27
Great-horned Owl	1-1 to 2-30	1-20 to 4-10	1-25 to 5-12	2-27 to 5-12	3-31 to 6-17
Long-eared Owl					
Short-eared Owl	3-6 to 4-12	3-28 to 5-3	4-2 to 5-28	4-25 to 6-28	6-1 to 7-29
Barn Owl	1-6 to 4-10	2-6 to 5-18	2-14 to 6-17	3-4 to 6-17	4-28 to 7-23
Snowy Owl	5-15 to 6-1	5-25 to 6-10	5-25 to 7-12	6-25 to 7-12	7-16 to 8-5
Barred Owl		3-20 to	3-24 to	4-14 to	
Spotted Owl	3-20 to 4-10	3-30 to 4-20	4-1 to 6-2	5-5 to 6-2	
Great Gray Owl		4-4 to 6-15	4-12 to 7-12	5-17 to 7-12	
Hawk Owl		3-20 to 5-5	3-20 to 6-7	4-26 to 6-7	
Burrowing Owl	4-17 to 5-25	4-30 to 6-6	5-1 to 6-17	6-4 to 6-17	7-3 to 7-10
Boreal Owl					
Saw-whet Owl	3-2 to 4-30	4-1 to 6-7	4-1 to 7-3	4-21 to 7-3	5-21 to 8-37
Whiskered Owl					

NESTING PHENOLOGY OF BIRDS OF PREY

SPECIES	Nest Building	Egg Laying	Incubation	Hatching	Fledging
Flammulated Owl	4-22 to 5-12	5-18 to 6-4	5-20 to 7-10	6-14 to 7-10	
Pygmy Owl		4-26 to 5-10			
Elf Owl		5-15 to 5-30	5-23 to 6-23	6-6 to 6-23	
Ferruginous Owl					

RAPTOR INVENTORY DATA SHEET
[for field notebook (looseleaf)]

Observer ____________ Nest Number ____________

Date of Observation ________ Species ____________

Land Ownership: P S BLM Location: T____ R______ Sec.______

Description of Nest Site:

Nest Substrate ____________

Height of Substrate __________

Height of Nest Above Ground___

Active_____ Inactive__________

No. of Eggs or Young__________

Exposure______________________

Elevation_____________________

Vegetative Type_______________

(Topographic Map)

Remarks:

(Photograph)

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